



# wildlife matters

australian



wildlife  
conservancy

Summer 2010/11



Protecting a  
lost world in  
the Kimberley

# saving australia's threatened wildlife



## the awc mission

The mission of Australian Wildlife Conservancy (AWC) is the effective conservation of all Australian animal species and the habitats in which they live. To achieve this mission, our actions are focused on:

- Establishing a network of sanctuaries which protect threatened wildlife and ecosystems: AWC now manages 21 sanctuaries covering over 2.5 million hectares (6.2 million acres).
- Implementing practical, on-ground conservation programs to protect the wildlife at our sanctuaries: these programs include feral animal control, fire management and the translocation of endangered species.
- Conducting (either alone or in collaboration with other organisations) scientific research that will help address the key threats to our native wildlife.
- Hosting visitor programs at our sanctuaries for the purpose of education and promoting awareness of the plight of Australia's wildlife.

## about awc

- AWC is an independent, non-profit organisation based in Perth, Western Australia. Donations to AWC are tax deductible.
- During 2009/10, more than 90% of AWC's total expenditure was incurred on conservation programs, including land acquisition. Less than 10% was allocated to development (fundraising) and administration.

*Cover Photo:* The Wyulda (Scaly-tailed Possum) is found only in the remote north-west Kimberley. (Photo: © Jiri Lochman Lochman Transparencies)

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Welcome to the Summer 2010/11 edition of *Wildlife Matters*. This is our 18th edition of *Wildlife Matters* and, in many respects, perhaps the most important. The initiatives and progress highlighted in the following pages illustrate not only the urgent need for a new model for conservation in Australia but also AWC's success to date in responding to that need. We are demonstrating through practical action – based on strong science – that it is possible to protect and restore ecological health.

AWC is unique in several respects: for example, around 80% of our staff are based in the field and we operate a substantial field-based science program that informs, and measures the success of, our land management operations. This focus on practical action ("getting things done"), combined with a commitment to innovation and a willingness to take measured risks, has enabled us to deliver land management at a scale not previously attempted by non-government conservation organisations.

- Our EcoFire project involves prescribed burning across more than 5 million hectares.
- We manage more feral predator-free land on mainland Australia than any other organisation.
- AWC has now translocated over 2,200 threatened mammals (with a very high success rate).
- In 2010, our biological survey program incorporated more than 80,000 trap nights.

Two of the projects described in this newsletter illustrate our ongoing commitment to scale and innovation, as well as the effective use of available resources.

- The **Artesian Range** project (pages 3-9) will result in AWC managing an area of extraordinary conservation value near the Kimberley coast. This narrow strip of the Kimberley is home to over 30 species of mammal, bird, reptile and amphibian that are found nowhere else in Australia, as well as several of northern Australia's disappearing small mammals. Through a partnership with a generous supporter, AWC will not be required to purchase the land: in other words, while we will need to invest in ongoing land management, *we have secured one of the most important properties in Australia at no acquisition cost to AWC*. This is an extraordinary result which we hope will inspire similar partnerships with other supporters.
- At Wongalara, AWC is set to establish **the largest feral herbivore-free area** in Australia (pages 14-15). Located only 100 kilometres from Kakadu National Park, where small mammal numbers have declined by 75%, the project is designed to drive a sustained increase in the population of small mammals in the heart of the current northern mammal declines. By demonstrating that the decline in mammals can be reversed in a cost-effective manner, we hope the project will be a catalyst for reviewing investment strategies across northern Australia.

AWC's conservation model is helping prevent extinctions by protecting critical remaining populations of key species. One of these species is the Bridled Naitail Wallaby: over 70% of the remaining population is found at Scotia Wildlife Sanctuary (see page 24). As a valued supporter of AWC, the future for the Bridled Naitail Wallaby, and many other species, is in your hands.

Thank you for your generous support and we hope that during 2011 you will continue to help AWC make a difference where it really counts – in the field!

Atticus Fleming  
Chief Executive

# The Artesian Range Project, Charnley River

## Protecting a lost world in the Kimberley



*The Artesian Range is a vital refuge for a suite of unique and threatened species*

*W. Lawler*

*“This region is critical for saving some of the threatened mammals of northern Australia, as well as species like the Monjon and the Wyulda which are found nowhere else in the world.”*

*Professor Tim Flannery*



After almost two years of negotiations, a remarkable world of rocky ranges and plateaux in the Kimberley is set to be protected by Australian Wildlife Conservancy. Bounded by the Charnley River, the area features a maze of deep rainforest-filled gorges and a network of complex sandstone ranges as well as towering escarpments and broad valleys filled with rich tropical woodlands. Of greater significance to AWC, the Artesian Range is located in one of the few areas in Australia – perhaps the only area – where there have been no mammal extinctions since European settlement. The area contains an extraordinary suite of mammals that are either endemic to the north-west Kimberley or rapidly declining elsewhere, making this location our highest priority for conservation in Australia.

## Setting our priorities

The mission of AWC is the effective conservation of all Australian animal species and their habitats. With the assistance of our supporters around Australia, we have made good progress in pursuit of our mission: for example, over 80% of all Australian bird species and nearly 70% of all mammal species are found on the AWC estate. Providing effective conservation for the 30% of mammals and nearly 20% of birds that we do not currently protect is one of the key factors guiding the selection of future projects by AWC.

Against this backdrop, two years ago we identified a narrow strip of land along the north-west Kimberley coast as a high priority area for AWC. An initial desktop analysis suggested this strip of land was vital to the continued survival of more than half a dozen mammal species, including several that were not found on any other AWC properties. It is also home to around 30 reptile, frog and bird species found nowhere else in Australia.

## Exploring the “lost world” of the Artesian Range and the Charnley River

As part of the EcoFire project, AWC staff have been working with other landholders to carry out prescribed burning across more than 5 million hectares of the Kimberley for each of the last 4 years. This involves literally hundreds of hours in helicopters, repeatedly criss-crossing the region and acquiring a detailed knowledge of the Kimberley landscape and its habitats. For staff involved in this project, including our National Conservation and Science Manager (Dr Sarah Legge), flying over one particular area of the Kimberley always caused additional excitement ... the Artesian Range and the associated habitats along the Charnley River. Here was a world of dramatic gorges, large pockets of rainforest and deeply incised rocky ranges. From the air, the Artesian Range – with its apparent protection from fire and low populations of feral herbivores – seemed certain to be an important refuge for the small mammals of the Kimberley.

Mindful that our desktop analysis had underlined the potential significance of this area, we set out to see first-hand whether the habitats of the Artesian Range looked

as promising from the ground. Our first visit occurred in late 2009. It was a typical summer day in the Kimberley: the temperature soared to over 100 degrees and the humidity was extreme as the helicopter dropped us beside a creek that tumbled through a succession of waterfalls and rocky pools before flowing into the Charnley River.

The oppressive conditions were soon forgotten. We were astounded to find such clear and bountiful evidence of a range of small mammals. As we scrambled across the rocks, scats and tracks were everywhere. This appeared to be a property unlike any other we had encountered in northern Australia – a property that was still relatively immune to the sharp decline in small mammal populations that has occurred from Cape York across to the central Kimberley. Within minutes, we saw scats of a large rodent (probably a Kimberley Rock-rat), flushed a bandicoot (possibly a Golden Bandicoot) and marvelled at the volume of rock-wallaby scats that saturated the rock ledges. As we climbed the escarpment above the creekline, we saw a Monjon, an endemic rock-wallaby, skipping across the rocks. A male Black Grasswren, the reward for only a few minutes searching for this species, confirmed the extraordinary values of the Artesian Range.

It was several months before another team from AWC could return to the Artesian Range, this time equipped with camera traps. Over



*The Charnley River carves its way through the Artesian Range*



*A rainforest gorge embedded within the Kimberley savanna in the Artesian Range*

*W. Lawler*

a short period of only a few nights, our cameras captured an extraordinary set of images. Many iconic and rarely seen Kimberley mammals, such as the Scaly-tailed Possum (Wyulda) were photographed (see pages 8-9 for images). It was clear that the Artesian Range did, indeed, protect some of Australia's highest priority mammals and that they existed here in relative abundance.

### Why is the Artesian Range and Charnley River region so important?

Against a backdrop of catastrophic declines in small mammal abundance across northern Australia, the Artesian Range region is of vital importance for the fauna of northern Australia.

**The Artesian Range retains its original mammal fauna:** The thin strip of Kimberley coastal land within which the Artesian Range is located is one of the few areas in Australia – perhaps the only area – where there have been no mammal extinctions since European settlement. In other words, the Artesian Range is probably unique in the fact that it has, over the last 200 years, retained its full complement of mammals. Many regions of Australia have lost around 20 species of mammals. In contrast, the Artesian Range and surrounding areas represent our last chance to protect an area that has not been affected by this wave of extinctions. It is our last chance to ensure that a small part of Australia survives largely intact, a reminder of the diversity and abundance of our wildlife as it was more than 200 years ago.

**The Artesian Range is home to many endemic species – animals found nowhere else in Australia:** The Artesian Range is a hotspot for several mammal species that are restricted to a small area of the Kimberley including the Monjon, the Wyulda and the Kimberley Rock-rat. There are also endemic birds, such as the Black Grasswren and the Kimberley Honeyeater, and a large number of endemic reptiles including almost certainly the rarely-seen Rough-scaled Python. It is an area with a truly unique assemblage of animals. The flora of the Artesian Range is just as impressive. There are literally hundreds of plant species – many still to be described – that are found nowhere else except in the rainforest gorges, rocky ranges, wetlands and other special habitats of the Kimberley coastal strip. For



*Golden-backed Tree-rat*

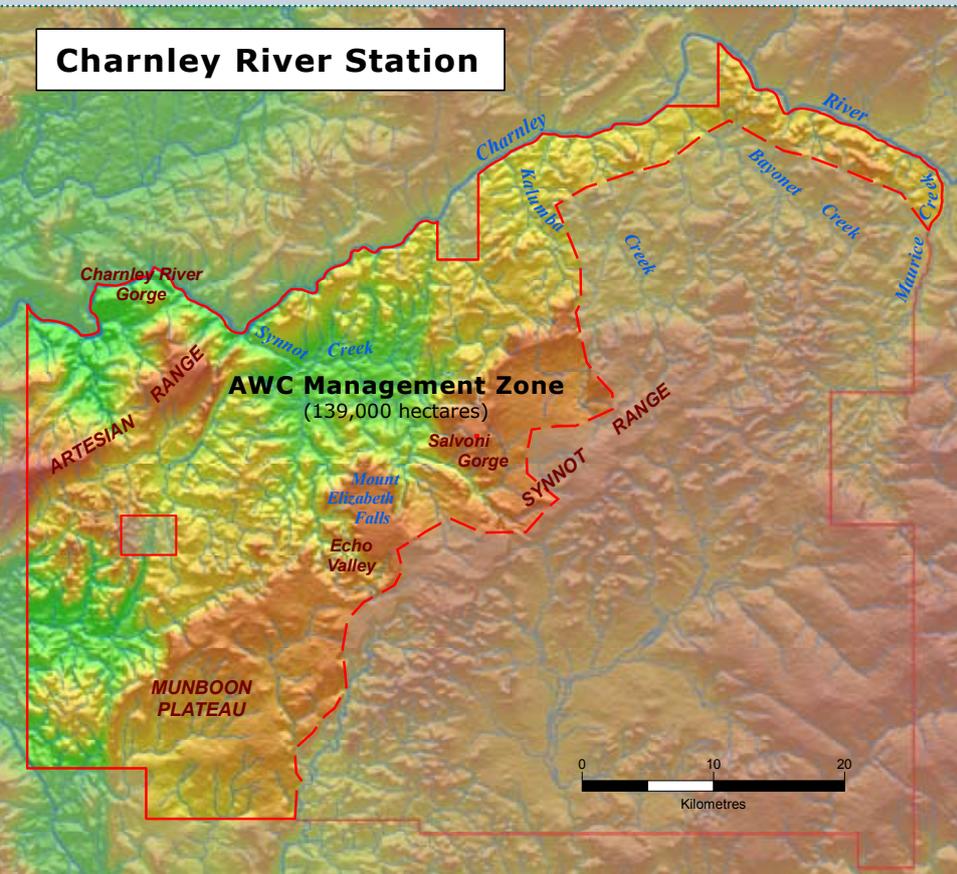
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AWC, the Artesian Range is an extraordinarily high priority because it is perhaps our only opportunity to deliver effective conservation for these endemic species, none of which are found on other AWC properties.

### **It is a vital last refuge for mammals in decline across northern Australia:**

As described in the Winter 2010 edition of *Wildlife Matters*, there has been a recent catastrophic decline in the distribution and abundance of small mammals in northern Australia. Even in Kakadu National Park, small mammal populations have declined by 75% in the last 15 years. However, the coastal Kimberley, including the Artesian Range, remains a stronghold for those species which are in sharp decline elsewhere in northern Australia.

## Charnley River Station



For example, the Golden-backed Tree-rat has now disappeared from the mainland Northern Territory: on mainland Australia, it is found only in areas of suitable habitat adjacent to the Kimberley coast. Other species which have declined dramatically but find refuge along the Kimberley coast – and which we expect to find in the Artesian Range - include the Golden Bandicoot and the Brush-tailed Rabbit-rat. Protecting places like the Artesian Range is an essential part of any strategy to reverse the decline of mammals in northern Australia. In effect, the Artesian Range must be where we draw a “line in the sand” in our battle to halt the tide of extinctions which are sweeping east to west across the tropical savannas of northern Australia.

## Structuring the Artesian Range Project on Charnley River Station

AWC supporters will be aware that we strive to be innovative in the way that we structure our projects, enhancing our ability to mobilise resources and ensuring the deployment of those resources is effective and efficient. At **Piccaninny Plains**, AWC and TLLF-WildlifeLink established a new model under which each party holds 50% of the title and jointly funds ongoing expenses. At **Seven Emu**, AWC has entered into a long-term sublease of an indigenous-held pastoral station and works in partnership with Frank Shadforth and his family to manage the property.

In order to secure the Artesian Range and its surrounding plateaux, we have helped to broker the acquisition of Charnley River Pastoral Station by a supporter of AWC. The contract to acquire Charnley River has now been executed, although completion of the sale is subject to consent from the West Australian Government. We hope the acquisition by our supporter will be finalised in early 2011.

Subject to approval from the WA Government, our supporter will delegate to AWC for at least the next 45 years the responsibility for management of the Artesian Range and surrounding high conservation value areas (139,000 hectares). Our role will include delivery of fire management, the control of feral cattle and other feral animals and implementing other land management tasks (such as weed control). We will also undertake a program of biological surveys, monitoring and research to safeguard the unique assemblage of Kimberley mammals, birds and other fauna and flora which find refuge in the Artesian Range. Our role will complement the continued operation of a pastoral enterprise focused on the balance of the property.



The Artesian Range has many pockets of wildlife-rich rainforest

W. Lawler

# We need your help to protect Charnley River and the Artesian Range

The ground-breaking deal we have helped to structure, and the very generous initiative of our supporter, mean we do not need to raise funds to acquire the property, nor do we need to make any annual rental payments. However, we do need your help to fund the protection of species like the Golden Bandicoot, the Monjon, the Kimberley Rock-rat, the Rough-scaled Python and the iconic Black Grasswren.

Funds are required to purchase equipment; establish a field base; engage field staff; and the usual running costs (vehicles, fuel, etc). **Please help protect this unique place and its wildlife ... perhaps the only place in Australia which has not yet been touched by our extinction crisis.** Your support will ensure at least a small part of Australia remains intact, largely as it was 200 years ago.

- o \$300 will acquire a radio collar for a Monjon or a Wyulda
- o \$1,000 will support an AWC field ecologist or land manager for 3 days
- o \$5,000 will fund a team of indigenous rangers for a week
- o \$10,000 will support nearly 2 kilometres of fencing to exclude feral herbivores from wetlands and other sensitive sites
- o \$20,000 will fund fire management for a year
- o \$60,000 will buy a Toyota Landcruiser to be based in the Artesian Range

**To donate, please see the donation form insert or the back page of this newsletter; visit [www.australianwildlife.org](http://www.australianwildlife.org); or call 08 9380 9633.**



Rainbow Pitta

[graemechapman.com.au](http://graemechapman.com.au)



The Monjon is confined to the north-west Kimberley

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Charnley River Gorge

W. Lawler

## Golden Bandicoot

(*Isoodon auratus*)

Family: Peramelidae (Bandicoots)



An unidentified bandicoot species in the Artesian Range

With a beautiful golden-brown coat, the Golden Bandicoot is one of the prettiest of its kind, but also one of the most cryptic. When settlers first pushed into the edges of the arid Australian centre, Golden Bandicoots could be found among the sand-dunes and spinifex. However, by 1960, the last Golden Bandicoots had disappeared from the desert interior. The species still persists in a remote section of the north-west Kimberley and on some islands off Western Australia and the Northern Territory.

A poignant incident earlier last century holds the key to the Golden Bandicoot's demise. Hermite Island was a safe haven for Golden Bandicoots until 1912 when feral cats were introduced, after which their disappearance was swift and complete. In stark contrast, Golden Bandicoots are still common on Barrow Island where cats are absent.

The Golden Bandicoot is one of the key threatened species that AWC is aiming to protect with knowledge generated by our feral cat research program across northern Australia. We will apply this knowledge as part of our on-ground management in the Artesian Range, where we expect to find Golden Bandicoots in the remote rugged sandstone country. The Artesian Range will also host an important population of the Northern Brown Bandicoot, another bandicoot species that has declined elsewhere across northern Australia.



## Kimberley Rock-rat

(*Zyomys woodwardi*)

Family: Muridae (Rats and Mice)



Kimberley Rock-rat, Charnley River

Only found in some parts of far north-western Western Australia, Kimberley Rock-rats live among boulder-filled scree and in crevices along the walls of gorges. They are very nimble creatures, able to bound from rock to rock at incredible speed. Their staple foods are grass seeds and the seeds of woodland and rainforest trees.

The rock-rats are an old lineage of Australian rodents. There are four species in the group. The Common Rock-rat is found in a variety of rocky habitats right across northern Australia, but each of the other three species have very restricted distributions, and appear to be especially sensitive to mismanaged fire. For example, the Central Rock-rat of the West MacDonnell Ranges, and the Carpentarian Rock-rat of the Gulf of Carpentaria, are both nationally Endangered.

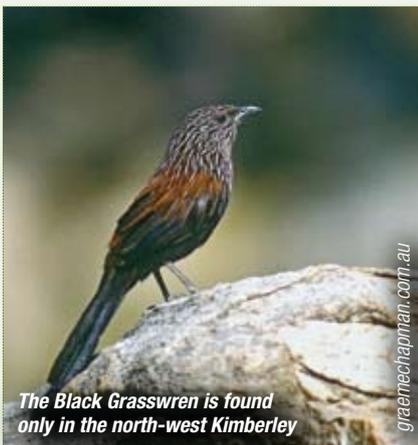
The lack of survey effort within the north-west Kimberley means that we have very little information about the population size and trends of the Kimberley Rock-rat. While their core habitat remains intact, unmanaged fires have the potential to affect this rock-rat's supply of seed. Carefully managing fire through the EcoFire program on Charnley River and neighbouring properties is crucial for protecting the habitat of the Kimberley Rock-rat.



## Black Grasswren

(*Amytornis housei*)

Family: Maluridae (Fairy wrens and allies)



The Black Grasswren is found only in the north-west Kimberley

Much sought-after by keen birdwatchers, the Black Grasswren is one of the most difficult of this group to see in the wild because they are restricted to the rugged, rocky terrain of the north-west Kimberley. A metallic chattering call is usually the first indication of the nearby presence of a family of Black Grasswrens. However, catching a glimpse of these elusive birds is a challenge because they easily blend into the shadows of the cracks and crevices they frequent.

The largest species in the grasswren group, Black Grasswrens forage on the ground for seeds and insects, frequently ducking back into the cover of a spinifex tussock. Over the wet season they build dome shaped nests in the spinifex and rear two chicks, which might stay with them the following year to help raise the next brood.

Given their dependence on spinifex for food, shelter and nesting spots, careful fire management on Charnley River will be vitally important in helping to secure a significant area of the Black Grasswren's habitat.



## Monjon

*(Petrogale burbidgei)*

Family: Macropodidae (Kangaroos and Wallabies)



A Monjon is captured on an AWC camera trap, Artesian Range

The smallest of all the rock-wallabies, the Monjon was only discovered by scientists in 1976 in a remote part of the north-west Kimberley. Due to its inaccessible habitat and recent discovery, virtually nothing is known about its biology. Those few who have observed Monjons note that they squeeze into horizontal crevices during the day and thump their feet loudly on the rock to warn other Monjons of intruders.

Monjons co-exist with Short-eared Rock-wallabies and Nabarleks in parts of the Kimberley, including the Artesian Range. Nowhere else do three rock-wallaby species live together, which suggests some fascinating differences in habit between these species. Due to their small size (no more than 1.5kg) Monjons are vulnerable to predation by feral cats. This is especially concerning given the likely role of feral cats in the mammal declines currently affecting northern Australia, and the precipitous decline recently documented in the Northern Territory by the similar-sized Nabarlek.

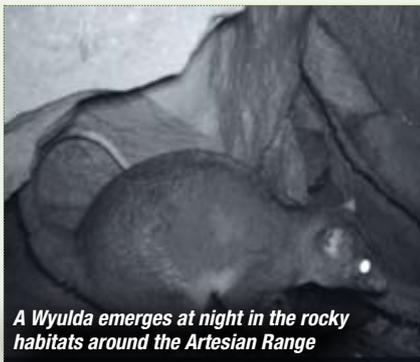
Charnley River is on the southern edge of the Monjon's range in the Kimberley. Images of Monjons were collected from camera traps on our visit earlier this year. The Artesian Range Project is an exciting chance to provide active, on-ground protection for this species and to conduct the first fundamental research into Monjon biology.



## Wyulda

*(Wyulda squamicaudata)*

Family: Phalangeridae (Brush-tail Possums, Cuscuses and Scaly-tailed Possum)



A Wyulda emerges at night in the rocky habitats around the Artesian Range

The Wyulda inhabits extremely rugged, rocky country in the remote north-west Kimberley. Clearly more comfortable among rocks, the Wyulda will descend to the ground if disturbed from a tree and scamper immediately into a rock crevice.

The rusty-coloured fur on its rump ends abruptly where its peculiar naked tail starts. This tail makes the Wyulda one of the most agile of its family, enabling it to hang upside-down from branches as it feeds on fruits and leaves. Rather than being scaled, the tail is formed of raised tubercles, each surrounded by tiny black hairs.

Although now restricted to the north-west fringe of the Kimberley, Wyulda were probably once more widespread, as two specimens were found near Halls Creek in the early 1900s. Feral cats and changes in fire patterns are the most likely causes for the Wyulda's retreat to their north-west stronghold.

The Wyulda shares its home with other rock-dwellers on Charnley River: Rock Ringtail Possums, Monjons, Short-eared Rock-wallabies and Nabarleks. AWC now has a special opportunity to provide effective conservation for this unique suite of animals.



## Rough-scaled Python

*(Morelia carinata)*

Family: Pythonidae (Pythons)



The Rough-scaled Python

B. Manjan

With only a handful of animals ever observed in the wild, the Rough-scaled Python is the "holy grail" for many herpetologists. It was described by scientists as recently as 1981 and has one of the smallest distributions of any large, conspicuous snake. Rough-scaled Pythons are restricted to the north-western Kimberley, and seem to be mainly associated with rugged sandstone caves and outcrops dominated by vine thicket and small patches of monsoon forest.

For its size (around 2m in length), it possesses an unusually large, triangular head, which is very distinctly placed at the end of its extremely slender neck. It is the only python to have a keeled texture to its scales and has some of the longest teeth of any snake relative to its size. These are probably adaptations for an arboreal lifestyle, as it spends much of its time up in the tree canopy and has the ability to penetrate its teeth through the dense fur and feathers of its prey, while maintaining a tight grip on a supporting branch.

The first fauna surveys on Charnley River hope to confirm the presence of this enigmatic snake.



*Distribution maps for mammals modified, with permission, from Menkhorst and Knight 2010, "A Field Guide to the Mammals of Australia", Third Edition. Dark green denotes current extent; light green denotes previous distribution. Arrows indicate populations on islands.*

# A regional approach in the Kimberley

The Kimberley is one of Australia's most iconic regions. As small mammal populations contract from east to west across the tropical savannas of northern Australia, the Kimberley is becoming even more important to the future of our wildlife. For many species, the region is a final refuge and the last hope for survival. Working with pastoralists, indigenous communities, tourism operators and government agencies, AWC is playing a leading role in implementing practical, on-ground land management strategies that are focused on the real conservation issues in the Kimberley – fire management and the control of feral animals and weeds.

## Fire management across 5 million hectares

As regular readers of *Wildlife Matters* will be aware, AWC has now been working for four years with landholders in the central and northern Kimberley to deliver EcoFire - a coordinated regional fire management project covering 14 properties (5 million hectares). The centrepiece of EcoFire is a prescribed burning program carried out each year in the early dry season between April and June. The primary objective of this prescribed burning is to reduce the incidence of extensive and intense fires that occur later in the year. These late fires (which often cover hundreds of thousands of hectares) have severe impacts on wildlife, damage cultural sites and cause economic loss for pastoralists (by removing large areas of pasture).

AWC manages the EcoFire project, working with individual landholders to plan and implement the prescribed burning operations on each property.

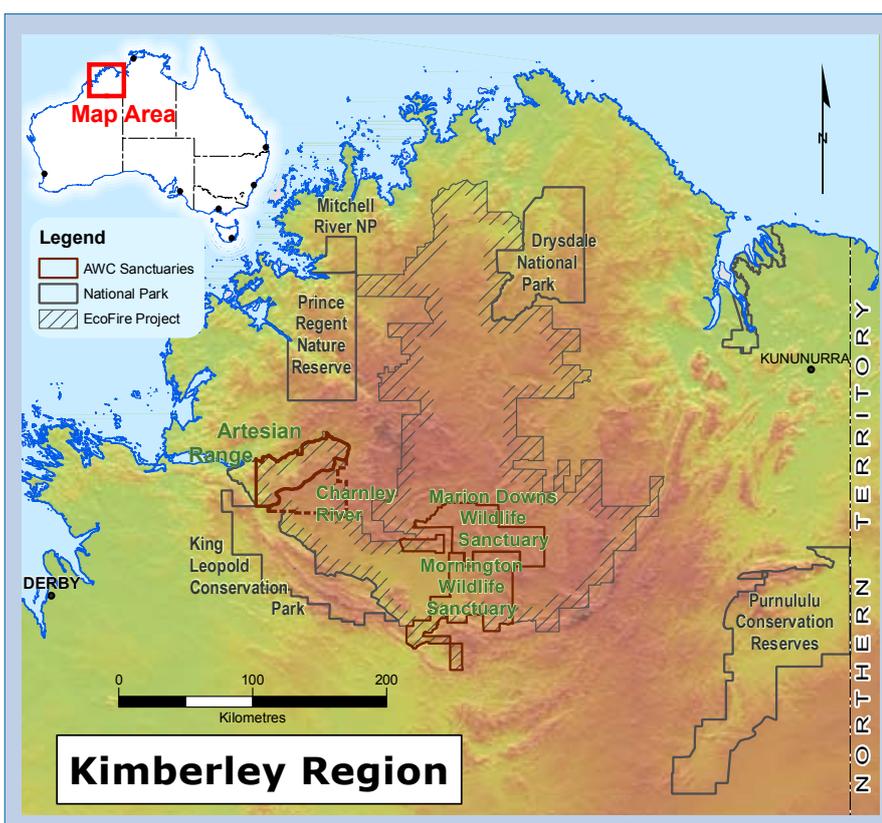
In 2010, AWC staff flew over 23,400 km in a helicopter with participating landholders, and dropped 52,000 aerial incendiaries in accordance with the prescribed burning plans for each property, which are integrated to form an overall burn plan for the region. Our aim is to use controlled burning to create strategic firebreaks, and break up patches of same-age vegetation, thus limiting the ability of later, damaging fires to spread. The aerial program was supplemented with prescribed burning carried out from the ground in sensitive areas, including around communities and some cultural sites on Mornington.

An analysis of satellite imagery at the end of each year enables us to measure whether the prescribed burning has been effective at changing fire patterns. The results to date show that EcoFire has delivered a significant shift in fire patterns, with a much higher proportion of fires occurring early in the dry season when fires are less intense, and much less extensive. In other words, we have substantially reduced the impact of late season wildfires. This measurable success reflects the strengths of the EcoFire model: it is a remarkable on-ground partnership between pastoralists, indigenous communities, government agencies and AWC; it is based on good science; and it is delivered at an unprecedented scale in an extremely cost-effective manner.

## Strategic weed control

Building on a multi-year weed control program on Mornington, a team of AWC staff and 12 different members from the Tirralintji and Yulumbu indigenous communities have recently planned and carried out two large-scale strategic weed control projects in the central Kimberley. The first project targeted rubber bush along the entire catchment of Annie Creek, including the section of the catchment (well over half) that occurs outside the boundary of Mornington.

The second project focused on removing a number of different weeds from the environs of Lake Gladstone, a wetland of national significance on Mornington's north-eastern boundary. This is the largest natural wetland in the Kimberley: in 2005, cattle were fenced out of it in a collaborative project between AWC, our neighbours at Mt House Station and Tirralintji community. Without the continual disturbance from cattle, our latest efforts to remove weeds will accelerate the ecological restoration of this wetland.





*Boab valley in the Phillips Range, Marion Downs*

*W. Lawler*

Follow-up work will be carried out for both of these projects after the wet season in 2011. In addition, two more regional weed control projects are being added to the portfolio – first, a program to control *Parkinsonia* along the entire middle to upper catchment of the Fitzroy River; and, second, a project to control grader grass which is spreading along the roads in the Kimberley. The grader grass project is being carried out in partnership with a range of Kimberley landholders through the North Kimberley Land Conservation District Committee.

## A multi-layered approach to feral animal control

Mornington is the site of the largest feral herbivore-free area in Australia, with feral cattle, donkeys, and horses removed from over 40,000 hectares of tropical savanna enclosed by strategic fencing and impenetrable escarpment. In this feral-free area, we have recorded a significant increase in the species richness and abundance of small mammals. We are now seeking to replicate this success at Wongalara by establishing an even larger feral herbivore-free area in the Top End (see pages 14-15).

With this landscape-scale project complete in the southern part of Mornington, the focus has shifted to limiting the impact of feral herbivores at specific, highly sensitive sites like the stunning narrow valleys of the Phillips Range and the perennially flowing mound springs of Marion Downs. These areas can be protected with relatively short lengths of fencing. A team of AWC staff and members of the local indigenous community have erected fences at the narrow entrance to the Phillips Valley, and around three separate mound springs in Siddins Valley. Mornington is also the centre of a large program on the ecology of feral cats (see pages 12-13).

## Developing our science and operations base

A defining feature of AWC's approach to conservation is the fact that around 80% of our staff are based in the field. In this respect, our "business model" is unique in the conservation sector. At Mornington, we are fortunate to have the WildlifeLink Centre for Research and Conservation, incorporating high-tech research facilities, which hosts a team of around 10 ecologists and land managers together with a number of students and volunteers. In recent months, we have commenced the upgrading of our operations base at Marion Downs. This base will host Lindsay Malay and his family, members of the local indigenous community. Lindsay has been employed by AWC in a land management role at Mornington-Marion Downs for two years. The new base will play a key role in supporting land management operations in the more remote parts of Marion Downs and the far northern section of Mornington.



*AWC staff and community members; weed management at Lake Gladstone*

*J. Heathcote*



*AWC staff member, Lindsay Malay, inspects feral exclusion fencing*

*J. Heathcote*

# Responding to the feral cat crisis

Feral cats kill at least 2 million native animals every day in northern Australia alone. They are helping propel the ongoing decline in small mammals across the north, just as they have already contributed to the extinction of many native mammals in central and southern Australia. However, while feral cats are an ecological disaster for Australia, very little practical action has been taken thus far to reduce their impacts. AWC is working with its partners to develop a response to the feral cat crisis, but the challenges remain substantial. Practical, creative solutions are required.

Following their introduction to Australia, feral cats spread rapidly across the continent. Cats are supremely adaptable, and now occupy all habitats from tropical rainforest to the deserts of the interior plus, of course, our urban environments. They are directly linked to the extinction of many native mammal species, and to the serious and ongoing declines of dozens of other native mammal, bird, reptile and frog populations.

There is currently no effective method for broadscale control of feral cats. Traditional approaches – including baiting – are ineffective. Cats are live prey specialists, which means they will not readily take baits. That trait, coupled with their cautious nature, also makes them reluctant to enter cage traps. AWC has been working closely with the WA Department of Environment and Conservation to trial new cat baits at Mt Gibson, with mixed results. Even if an effective bait can be developed, feral cats will soon re-invade any baited area.

To address the issue of reinvasion, AWC has established several permanent cat-free areas on mainland Australia (Scotia, Yookamurra and Karakamia) by utilising special predator-proof fencing. At Scotia, 7 threatened mammals have been reintroduced into the largest cat-free area on the mainland (currently 8,000 ha). In addition, AWC has worked with DEC to eradicate cats on Faure Island, the third largest island in the world from which cats have been removed.

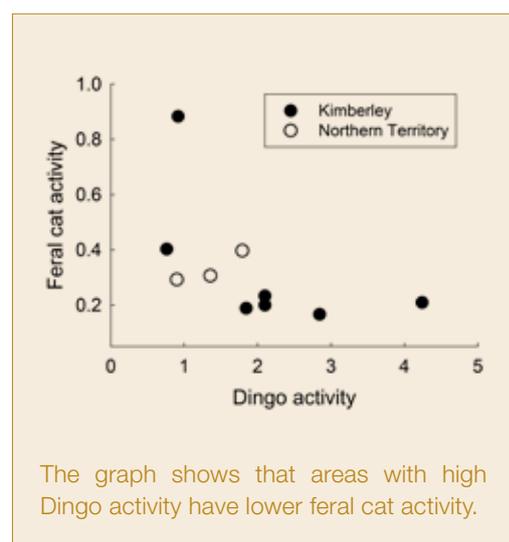
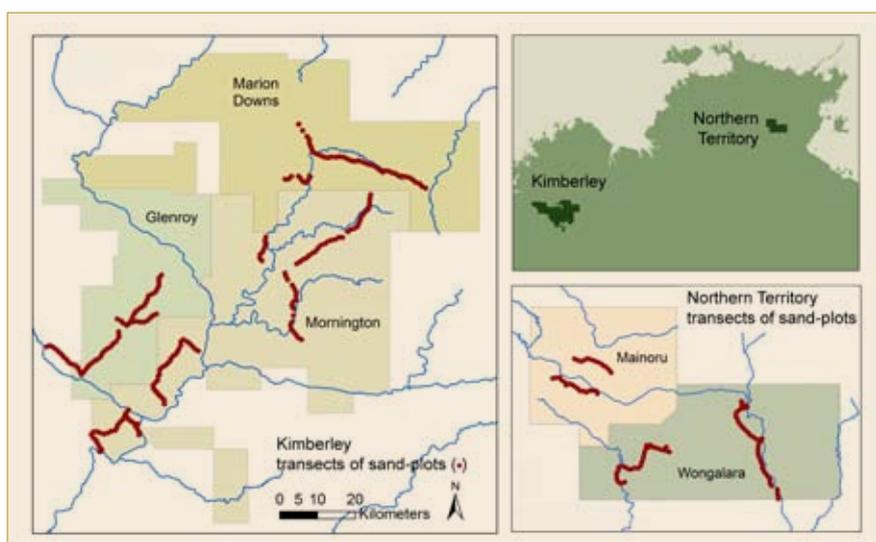
Islands and fenced areas require an extensive eradication program involving a range of methods including baiting, trapping and shooting. Once all cats are removed, the fence (or water, in the case of an island) operates to prevent reinvasion. It is a cost-effective strategy with exceptional outcomes, as demonstrated by the population of threatened species at Scotia, Yookamurra, Faure Island and Karakamia.

In the long-term, we need to move beyond fenced areas by finding a way to eradicate, or at least control, cats across the landscape. The Northern Mammal Recovery Project is investigating whether we can manipulate fire and other land management options to reduce the impacts of feral cats (see the Winter 2010 issue of *Wildlife Matters*). Another focus of this program is a multi-layered research project examining the role of Dingoes as regulators of feral cat populations.

## Use a large predator to control a small predator...

There is compelling evidence from many ecosystems in other parts of the world that large predators control the population size of smaller predators through direct interactions (killing them) and indirectly by competition and harassment. For example, there is evidence that Grey Wolves influence the behaviour and population of Coyotes in North America, while Lions influence the behaviour and populations of smaller predators in Africa. The Dingo is Australia's largest native predator and could play an important role in regulating populations of feral cats and foxes. If this is the case, promoting healthy and stable Dingo populations could be an effective control strategy.

Since 2007, AWC has been examining this issue at 3 AWC sanctuaries and 3 neighbouring properties in the Kimberley and Top End (see map), where we have collected data each year on the relative activity of feral cats and Dingoes. The data were collected by setting up 340 sand-plots along 10 standardised transects, and checking them for 4 consecutive days in each sampling period. This amounted to a total effort of over 4,500 sand-plot nights.



The graph shows that areas with high Dingo activity have lower feral cat activity.



Feral cats kill at least 2 million native animals every day in northern Australia

J. Heathcote

AWC field ecologists checking a sand-plot for Dingo and cat activity



J. Smith

The results clearly show that feral cat activity is lower at transects with sand-plots that have high Dingo activity (see graph). The sand-plots measure activity rather than abundance per se, so the observed correlation could arise either because cats are scarce where Dingoes are more active, or because cats avoid areas with high Dingo activity. In an effort to tease apart these possibilities, we took advantage of the fact that the neighbouring property owners intended to poison Dingoes using dried meat baits. Baiting selectively removes Dingoes but not cats because cats are not attracted to dried meat. In effect, the baiting is therefore an experimental manipulation of Dingo numbers.

We measured the activity of both Dingoes and cats before, and up to four weeks after, the baiting treatment to see whether a reduction in Dingo numbers resulted in a change in cat activity at our sand-plots. If cat density is unrelated to the presence of Dingoes, but cats respond to dingo activity with stealthy and flexible avoidance, we expected to measure an increase in cat activity after Dingoes were reduced by the baiting treatment. Alternatively, if cat density is genuinely related to Dingo density, then the sudden removal of Dingoes would not be associated with any immediate change in measures of cat activity.

Our results showed that whereas Dingo activity decreased by 55% following baiting, cat activity did not change, so either cats take a long time

to re-adjust their behaviour to changes in Dingo activity or, more likely, cat density really is affected by Dingo numbers. This research suggests that supporting a healthy and stable Dingo population can be effective in suppressing the *abundance* of feral cats (not just their behaviour). It is important because it provides hope that, at a landscape scale, we can use the Dingo to reduce the impact of feral cats on native wildlife.

At a broader level, this project highlights the importance of AWC's science role: we are using science to develop a practical response to a critical issue (feral cats); deploying a strong team of field-based ecologists; working closely with other landholders (in this case, pastoralists); and implementing a project at a national scale.

## When Sally met Tony...

As part of the Northern Mammal Recovery Project's focus on feral cat ecology, we have been training a dog to detect cats, in order to help us estimate abundance, clear cats from fenced areas, and catch cats for fitting radio-collars. At the time of the last edition of *Wildlife Matters*, Sally had become proficient at following dummy trails up to 1 km long, laid by dragging a cat skin through the grass. Over the past three months, Sally's initial training has been put to the test in the field, as she makes the transition from following cat skin trails, to tracking live cats. Tony Gonzalez, Sally's handler, has worked hard with Sally and the rest of the Kimberley team to make this critical step. The results so far are extremely positive, despite the extra magnitude of difficulty involved. Sally is successfully tracking feral cats, opening up our options for control or capture (to fit radio-collars) substantially. This project is carried out in partnership with James Cook and Charles Darwin Universities, CSIRO, and the conservation agencies of the WA, NT and Qld governments.



Tony Gonzalez (dog expert) and Sally (cat expert)

J. Heathcote

# Wongalara: establishing the largest feral herbivore-free area in Australia

There has been a recent catastrophic decline in the abundance of small mammals across northern Australia. Feral cats and feral herbivores – combined with altered fire regimes – are likely to be driving the decline in mammal populations. AWC, with its partners, is seeking to halt and reverse this decline through our ground-breaking Northern Mammal Recovery Project: a centrepiece of that Project is the establishment of a massive 1,000 square kilometre feral herbivore-free area at Wongalara.

AWC's Northern Mammal Recovery Project comprises a series of large-scale land management interventions at key sites from the Kimberley to Cape York. The most critical individual site is Wongalara. Covering nearly 2,000 square kilometres on the edge of Arnhem Land, about 100 kilometres from Kakadu National Park, Wongalara is located in the heart of the current precipitous declines.

## Evidence of the decline in the Top End

The extent of the mammal decline in the Top End is highlighted by the results of monitoring at Kakadu National Park: mammal populations in Kakadu have declined by a staggering 75% in the last 15 years. Kakadu is not an isolated case. It is, in fact, representative of the Top End and much of northern Australia (although it is much better resourced than any other protected area, with an annual budget of around \$20 million). At Wongalara, AWC has been conducting detailed monitoring of small mammal populations for four years. The results confirm that Wongalara's suite of small mammals, including iconic species such as the Kakadu Dunnart, are present at only very low levels. In other words, like Kakadu, the small mammal populations at Wongalara have been suppressed by feral animals and altered fire regimes.

**The challenge for AWC is to implement a land management strategy that delivers a measurable and significant increase in small mammal populations at Wongalara.**

## AWC's strategy at Wongalara

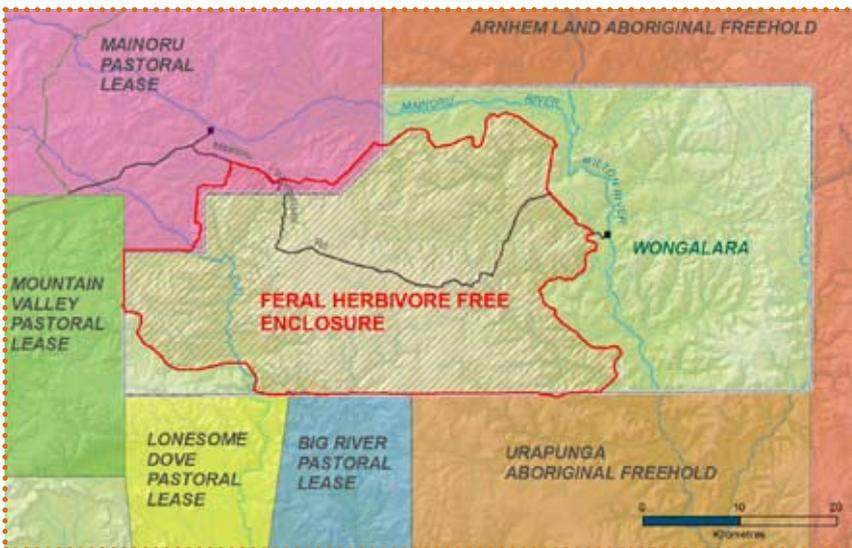
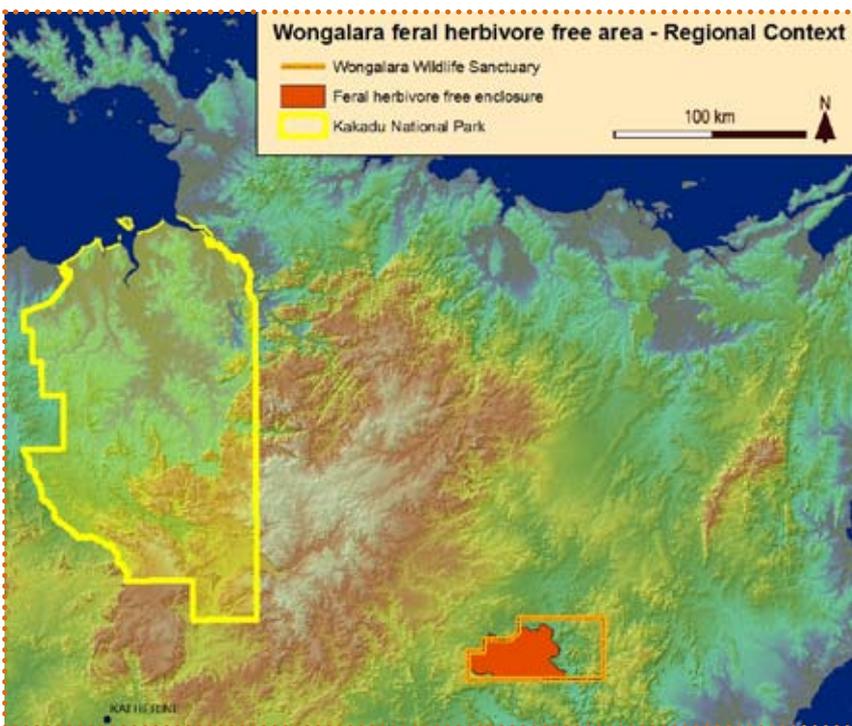
Over the past four years, we have implemented an active conservation management program at Wongalara. We have delivered fire management that has reduced the incidence of extensive late dry season fires. We have phased out baiting for Dingoes, in partnership with our neighbours, in order to allow Dingoes to act as a biological control for feral cats (see pages 12-13). Finally, we have removed 3,019 feral buffalo, cattle, horses, donkeys and pigs over this period.

We have also monitored the response of native wildlife to our management over the past four years. While we have seen an increase in reptile abundance in response to these management actions, the mammal populations have remained suppressed. We believe reducing the impacts of feral herbivores is the key to mammal recovery at Wongalara for two reasons.

First, the complete removal of feral herbivores from a 40,000 ha fenced area at AWC's Mornington Wildlife Sanctuary, in the Kimberley, resulted in a significant increase in small mammal populations. In other words, we have evidence that the strategy will work: Mornington is the only protected area in the tropical savannas with a large feral herbivore-free area, and also the only area where a recovery of small mammals has been recorded in the last decade.



AWC has removed more than 3,000 feral herbivores from Wongalara



Second, despite removing over 3,000 feral herbivores at Wongalara, constant immigration across unfenced boundaries means that the herbivore density increases again quickly after each removal; in other words, without an effective fence, we are unable to maintain low densities of feral animals throughout the year.

### Establishing a 1,000 km<sup>2</sup> feral herbivore-free area

Fence construction at Wongalara will be a major undertaking: the fenced area will have a perimeter of 168 km, and follow a route that currently lacks vehicle access. It will involve constructing 81 km of new fencing, upgrading 29 km of existing fencing that is now in disrepair, and incorporating 58 km of existing fencing that is already in good condition. The completed fence will need to exclude feral buffalo, as well as feral horses, donkeys and cattle. To achieve this, three sections of the fence that are likely to experience pressure from buffalo, each up to 30 km long, will be electrified.

The next step is removing feral herbivores from within the fenced area. A mustering program will remove the majority of animals. Feral cattle and buffalo will be pushed into portable yards with helicopters and bull buggies, and then trucked to market. Mustering will be followed by a shooting program to remove the last feral cattle and buffalo, as well as the horses and donkeys.

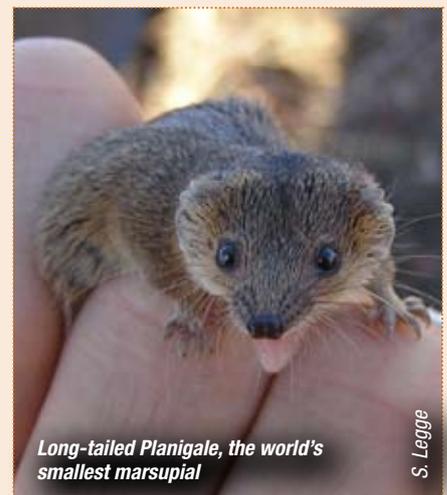
The project presents substantial operational challenges. Fence construction and feral herbivore removal both need to take place rapidly, during a period of just six months (May to October); fence construction can't begin before the end of the wet season (in late April) because the ground and even formed tracks are not navigable to vehicles and heavy plant like graders. Mustering needs to be completed by October, because the rising temperatures late in the year make mustering too stressful for the animals.

## Cost-effective mammal recovery

The direct one-off capital cost (fence construction and feral herbivore removal) of creating the largest feral herbivore-free area in Australia is around \$400,000 or **\$4 per hectare**. The average annual operational costs for Wongalara are approximately \$400,000 per annum. Accordingly, if we can replicate the mammal recovery seen at Mornington, we will be delivering a very substantial ecological "return" for a relatively modest investment (noting again the annual investment of \$20 million at Kakadu where small mammal populations have decreased by 75%). We hope that success at Wongalara will have a catalytic impact by encouraging a renewed focus on feral herbivore control, including through fencing key conservation areas.

Since 2007 we have monitored native wildlife and vegetation at a network of almost 50 permanent survey sites scattered across Wongalara. During 2010, we redesigned the program to position the sites within, and outside of, the area to be fenced in equal numbers and in matching habitats. Over the next few years, we will measure changes in mammals, birds, reptiles, frogs and vegetation at the sites within the fenced area and compare this to the results from the 'control' areas outside the fence. In this way, we will be able to quantify the ecological return on our investment and, we hope, report to AWC supporters on a significant increase in small mammal populations.

### We need your help



Long-tailed Planigale, the world's smallest marsupial

S. Legge

Please help AWC establish the largest feral herbivore-free area in Australia. Every gift of \$100 will support the establishment of 25 hectares of the feral herbivore-free area at Wongalara. Your contribution will help halt and reverse the tide of extinctions in the Top End.



For example, the Streambank Froglet was captured at Buckaringa (it has a very narrow distribution, being confined to the Flinders Ranges) and the spectacular Crucifix Frog was recorded during a survey at Bowra. The relative rarity of frog records from the inland mean that these records often make important contributions to our knowledge of species distributions. For example, the annual Newhaven surveys confirmed a range extension for the Tanami Toadlet, and also revealed two distinct types of *Neobatrachus* sp.; either there is a single species present that exhibits high morphological variability, or there are two sympatric species present (*N. aquilonius* and *N. sudelli*) with the latter constituting a range extension. Resolution of this enigma requires genetic analysis.

## Pungalina-Seven Emu

AWC ecologists, interns and volunteers worked with the Garawa Rangers to carry out the second intensive biological survey of Pungalina-Seven Emu during May and June this year. The survey had several components. At the broadest level, the survey continued the task (begun in 2009) of confirming the species inventory for the sanctuary. In the 2010 survey, the team recorded 192 species of mammals, birds, reptiles and frogs; 33 of these had not been recorded previously. Some of the more distinctive and noteworthy new species included four species of bat, Arafura File Snake, Chameleon Dragon, Borroloola Dtella (which has a very small distribution in the Gulf), and records of two species of small carnivorous marsupials from the *Pseudantechinus* genus. The total vertebrate inventory now stands at 264 species, which is about 70% of all the species we predict we will find with continued survey effort.

Regular readers of *Wildlife Matters* will recall the excitement at the discovery of the rare Carpentarian *Pseudantechinus* at Pungalina-Seven Emu during 2009. The species was captured again during 2010 at two more locations, representing only the 21st and 22nd time this species has ever been captured. In addition, the Sandstone *Pseudantechinus* was also captured at three different locations. Although the Sandstone *Pseudantechinus* is more widespread (and can be locally common) compared with its Carpentarian cousin, it is noteworthy to find two close relatives living close together; further surveys are needed to find out whether the two species really are sympatric or if they segregate according to finer-scale habitat preferences.

Dedicated surveys for turtles were carried out at a series of waterholes and lakes. The aim was to catch several individuals of the enigmatic Snapping Turtle that was first caught in 2009, and which represents either a new species, or a variant of the Endangered Gulf Snapping Turtle.



Sofia Simon (Garawa Women's Ranger Group) assisting with a Northern Brown Bandicoot survey at Pungalina

S. Murphy



Chameleon Dragon, Pungalina-Seven Emu

R. Lloyd

Detailed morphological measurements and genetic samples were taken from each of these captured individuals, in order to help resolve the taxonomic puzzle. Large numbers of Worrell's Turtles and Long-necked Turtles were also caught during these waterhole surveys.

Northern Brown Bandicoots were the subject of a focal trapping study that aimed to quantify their abundance in the thick vegetation fringing the springs and creeks of Karns Creek. Northern Brown Bandicoots are one of a suite of native mammals that have declined from large parts of their range in northern Australia, and their persistence in relatively high numbers at Pungalina-Seven Emu is therefore significant. This four week project was carried out by AWC staff, interns and a team from the Garawa Women's Ranger Group.

## Bowra

AWC staff ecologists from the north-east and south-east regions met in Bowra in October to familiarise themselves with the sanctuary, estimate numbers of feral predators, carry out some preliminary inventory surveys and plan future systematic surveys for mammals, reptiles, frogs and plants to add to Bowra's existing and impressive list of bird species.

The preliminary survey work was comprised of active searches, and trapping with box traps, camera traps, sand-plots, harp traps and an ultrasonic detector (for bats, developed by Roger Coles, University of Queensland). Given that conditions were so good after a run of good seasons, botanist Rigel Jensen spent as much time as possible collecting flowering plants, with over 100 herbarium specimens collected.

The survey confirmed the presence of 46 vertebrate species (excluding birds). Ten of these species were frogs, reflecting the relatively wet conditions prevailing during 2010. One of the more colourful species recorded was the Crucifix Frog, a distinctive ground frog of western Queensland and NSW, which spends prolonged



G. Fetting

In her role as AWC Ambassador, Kristy Hinze, who is studying biology in the USA, visited Pungalina-Seven Emu to learn about our conservation programs. Kristy spent some time with the survey team and enjoyed the unique experience of releasing the 21st Carpentarian Pseudantechinus ever captured.

periods of drought cocooned underground. Rain brings these frogs out to breed in temporary pools. Crucifix Frogs can produce an elastic, contact "glue" from the skin on their back that is stronger than available medical glues, and works even when wet. Various functions of this glue have been proposed, including to startle and ward off predators, to trap small invertebrates (which the frog then consumes), and even for males to bind themselves to females during mating.

Twenty-two reptile species were recorded (including six new confirmations for the property). The new confirmations included four beautifully-marked geckoes (Box-patterned Gecko; Tessellated Gecko; Beaked Gecko; Eastern Spiny-tailed Gecko), as well as a blind snake and a skink. One interesting reptile record was of the cryptic Pebble Dragon. These Dragons tuck their arms and legs into their fat little bodies to mimic pebbles. This species was recorded only in the stony ridge country in the north of Bowra.

Fourteen species of mammals were recorded including seven microbats, four of which were new confirmations for the sanctuary. This number may increase as ultrasonic data are analysed.

One of the major aims of this inaugural Bowra survey was to design and establish a network of sand-plots and camera traps that will be monitored regularly to provide indices of abundance for feral foxes and cats. The first round of data from 454 trap-days was collected, providing information on the location and relative intensity of pig, rabbit, feral cat and fox activity. Feral animal control (rabbits, house mice, pigs, foxes and cats) will be a key management challenge at Bowra, and a robust monitoring system will help us assess management effectiveness.



Eastern Spiny-tailed Gecko, Bowra

E. Mulder



Crucifix Frog, Bowra

M. Hayward

# Measuring ecological health



*Tammar Wallabies have been reintroduced at Karakamia and Paruna*

*W. Lawler*

AWC is committed to implementing a science-based program that measures the ecological health of our sanctuaries over time. Such measures are vitally important in evaluating the effectiveness of our land management strategies and, as necessary, refining those strategies. When combined with financial indicators, our ecological health framework will provide information on which strategies deliver the highest “effective conservation” return per dollar of investment. While our framework continues to develop, our objective is always to maximise the number of Bilbies, Gouldian Finches, Carpentarian Pseudantechinus and other species that can be protected with our available resources.

We measure and report on ecological health by implementing monitoring plans for each sanctuary which follow a consistent framework. As set out in the Summer 2009/10 edition of *Wildlife Matters*, this framework is based on measuring a suite of biological indicators for each sanctuary that collectively inform us about:

- whether native species are being retained and, as necessary, restored;
- whether ecological processes are functioning; and
- whether threatening processes have been reduced below ecologically significant thresholds.

Below are examples of recent data collected for indicators in each of these three categories.

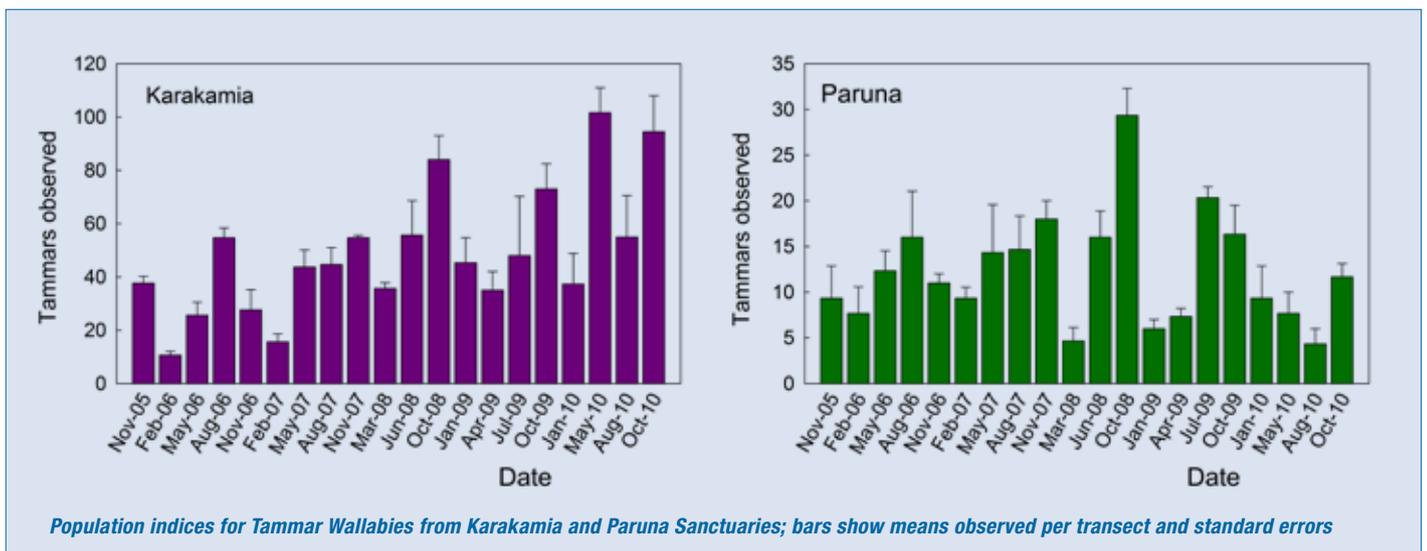
## Are native species being maintained and restored?

At each sanctuary, we measure a suite of species that collectively indicate whether biodiversity is being maintained and restored on that sanctuary. Selected species are generally those that are most likely to be lost from the landscape, or those that are known to be sensitive to environmental change. In addition, we need to choose species whose ecology and behaviour we understand sufficiently, so that the monitoring data can be interpreted in a knowledgeable and meaningful way.

### ***Tammar Wallabies in the South-West***

Tammar Wallabies have been reintroduced to Paruna and Karakamia Wildlife Sanctuaries, near Perth. At both sanctuaries, we monitor the populations every quarter with a standardised survey, which involves following a set transect route and counting animals using a spotlight. The route is repeated for three consecutive days during each quarterly survey, and the average number of animals seen along each transect over these three days is calculated.

The graphs on page 20 show the results of the spotlight surveys for both sanctuaries since 2005. Following an initial reintroduction



to Karakamia in 1998, the population index there has steadily increased. In contrast, the population index at Paruna has held its own over time, but without clear signs of increase. The increase in the index at Paruna during 2009 is partly explained by a supplementary translocation of 17 extra Tammar Wallabies at that time.

The difference between the two sets of results is explained by the complete exclusion of feral predators at Karakamia (thanks to a feral-proof fence which encircles the sanctuary), whereas feral predators on Paruna are controlled by a partial fence, and a sustained baiting program. As well as suggesting that the ecological health, in terms of species maintenance, is higher at Karakamia than Paruna, the different trajectories of the two populations provide critical management information, because they highlight the importance of feral predator control for the long-term survival of this species, and they demonstrate that fenced areas will be a critical conservation tool for the foreseeable future.

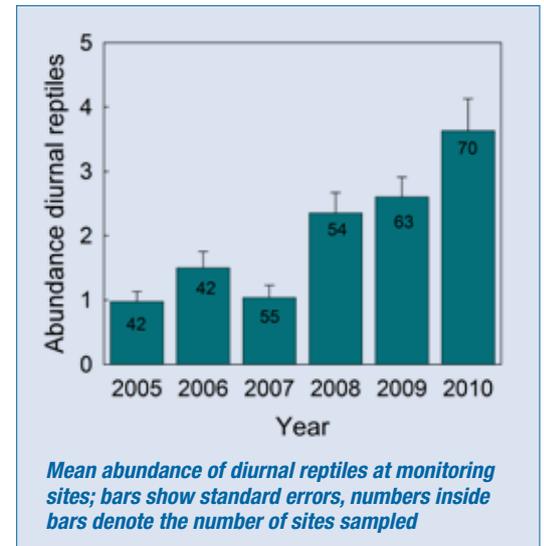
### Diurnal reptiles in the Kimberley

Ground-dwelling skinks and dragons that are active during the day (rather than at night) are likely to be sensitive to changes in the structure and complexity of the ground and grassy layers. Some reptile species are specialist inhabitants of the leaf litter, and others rely on well-developed grass cover to protect them from predators, and to provide shade during extremely hot summer days.

Mismanaged fires and the presence of feral horses, cattle and donkeys reduce the structure and complexity of the leaf litter and grass layer. At Mornington and Marion Downs, we have substantially reduced the impact of these threats through effective land management. We measure the reptile communities at up to 70 of our permanent monitoring sites each year in a range of different vegetation types. The graph on this page demonstrates that the average number of diurnal reptiles captured at monitoring sites has increased steadily since 2005, as the density of large herbivores and the incidence of extensive, intense fires have been reduced.

## Are ecological processes functioning?

Ecosystems are maintained by invisible processes such as the cycling of water and nutrients, the dynamic interactions between species, and the balance of disturbances that stimulate moderated change. Fire is a naturally occurring



disturbance process in almost all Australian ecosystems. However, where recent changes in land use have altered the frequency and intensity of fire, it ceases to function as a disturbance process that maintains ecosystems and becomes a process that damages ecosystems; active fire management is required to restore the right level of disturbance.

### Disturbance processes at Wongalara

The Callitris Pine of northern Australia is an example of one of many species that have been impacted by an increased frequency of intense fires across our tropical savannas. Intense fires kill adult trees, and frequent fires (especially if they are intense) prevent recruitment. Over time, the contemporary shift in fire patterns towards frequent, intense fires has led to a decrease in the populations of this tree species in many areas of the north.

We monitor populations of Callitris on some northern sanctuaries as an indicator of whether, in the medium to long term, fire has been effectively functioning as a natural disturbance process that maintains (rather than damages) ecosystems. We do this in two ways. First, we use an aerial survey, along fixed transects, to estimate the ratio of dead to live trees. The charred stumps of Callitris remain visible for decades, as the wood is



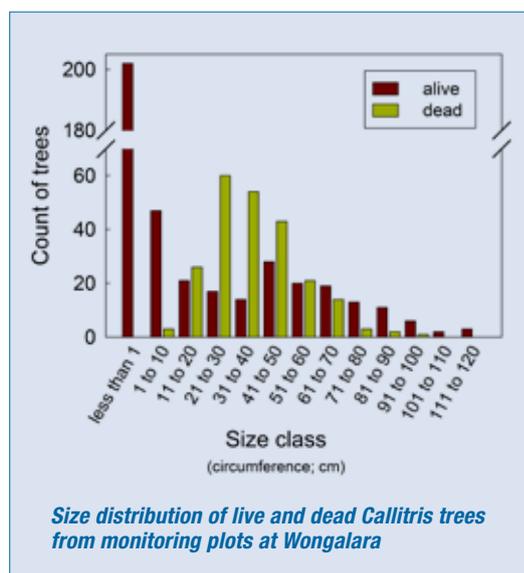
Kimberley Rock Monitor, Mornington

S. Legge

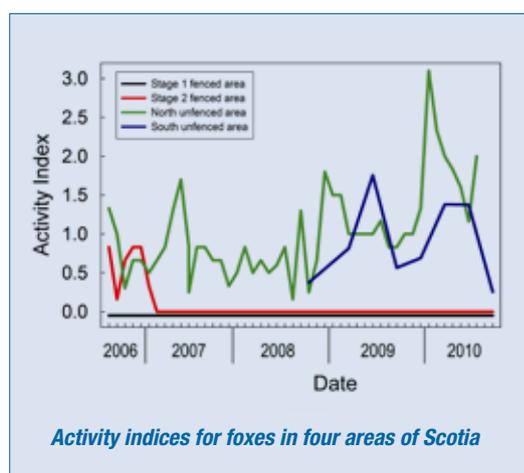


*Callitris is an indicator at northern sanctuaries including Wongalara and Pungalina*

W. Lawler



*Size distribution of live and dead Callitris trees from monitoring plots at Wongalara*



*Activity indices for foxes in four areas of Scotia*

tough and relatively termite resistant. A comparison of the ratio of living to dead trees provides information on historical fire patterns: a high proportion of dead trees indicates a recent increase in the frequency of intense fires.

We carried out the first aerial survey of Callitris on Wongalara in 2009; along a 200 km transect, we counted 1,523 trees, of which 30% were dead. The aerial survey will be repeated every 5 years, and over time, we expect the proportion of living trees to increase, as AWC's fire management reduces the frequency of intense fires (and so restores fire to its role as a disturbance process that maintains ecosystems).

The second way we monitor Callitris is by measuring the number and size of individual live trees within permanently marked plots spread throughout Wongalara. In the first round of plot surveys, we measured the stem circumference of 730 trees, of which 31% were dead. The frequency distribution graph (top right) shows that most dead trees have a circumference less than 50 cm (equivalent to a diameter of less than 16 cm), but that there is a healthy 'crop' of young recruits in the wings. Careful fire management should allow many of these recruits to mature, and the next round of monitoring in 3-5 years time should record a shift in these size distributions towards a higher frequency of mature trees.

## Are threats being abated?

Our ecological health framework requires the impact of all material threats on a sanctuary to be measured. This reflects our assumption that landscapes are healthier when threats such as feral animals and weeds are abated. Measures of threat abatement also provide direct information on the effectiveness of our land management strategies.

### Feral foxes at Scotia

At Scotia, in the mallee of western New South Wales, we measure the activity of feral animals (foxes, feral cats, rabbits, goats). A permanent network of sand-plots and transects across the 65,000 hectare property is measured several times each year. Some of the plots are within the 8,000 hectare feral-free area (Stage One and Stage Two). At each measurement, the plots are inspected on four consecutive days for feral animal tracks.

The lower graph illustrates a number of points. First, during the sampling period, Stage One (the original feral-free fenced area) has remained fox-free. Second, the feral-proof fence around Stage Two was completed in 2006 and an intensive feral animal control program eradicated foxes from this area by January 2007; fox numbers have remained at zero ever since. We continue regular monitoring inside Stages One and Two in order to ensure there are no feral animal incursions. Finally, during 2009, above average rainfall in the region set in motion a surge in rabbit numbers, and a consequent spike in fox numbers. This regional increase in foxes is reflected in the tracking data from the sand-plots on Scotia.

In response to this evidence, we implemented a more intensive baiting program across the southern half of Scotia, leaving the northern half as a 'control'. Fox activity in the south decreased earlier, and more markedly, than fox activity in the north; as a result, the southern fox activity peaked at under half that of the north, and has now been dampened to one-tenth of the fox activity in the northern control area. These differences between the northern and southern activity indices demonstrate that our fox management was effective at reducing the scale and duration of the regional spike in fox numbers and this information is being used to inform ongoing fox control strategies.

# Protecting Australia's rock-wallabies

Australia has 16 species of rock-wallaby, spread across the continent in a diverse array of environments. Emphasising AWC's unique position as a national, on-ground conservation organisation, we are now protecting populations of 7 (possibly 8) of these species, including three species listed as threatened. Controlling feral animals – predators and competitors – and undertaking strategic translocations to re-establish colonies are our highest management priorities.

Rock-wallabies are a distinct group within the kangaroo family and are most closely related to tree kangaroos. Whilst tree kangaroos are adapted for arboreal living, rock-wallabies are magnificently adapted for a life on rocks. Their foot pads are broad, with reduced claws and thick granular pads; these features give excellent grip on rock surfaces. They also have long flexible tails which they use as a counterbalance when leaping from ledge to ledge. They are remarkable among rock-dwelling animals because they do not climb hand over hand but instead bound in single leaps. They move with astonishing accuracy as there are no second chances after a misplaced step.

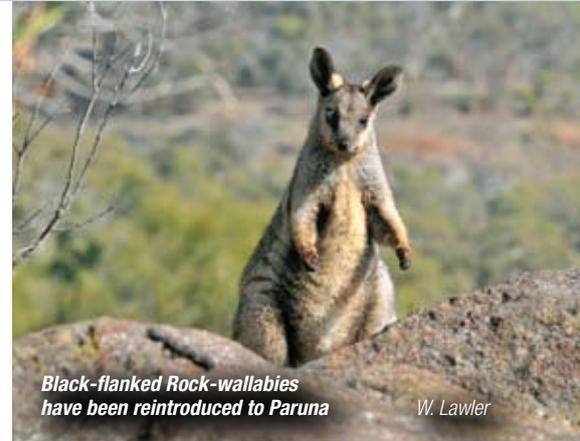
By virtue of living on rocky outcrops, rock-wallaby colonies can be very isolated, with long distances between neighbouring colonies. Over time, populations have been cut off from one another and have eventually diverged into separate species.

## Threats

Rock-wallabies, weighing between 1 and 12 kg, are within the size range of Australian mammals with the highest extinction rate over the past 200 years. However, unlike other groups, no rock-wallaby species has yet gone extinct. Nonetheless, many rock-wallabies have declined and contracted in range, and now face the risk of extinction.

The key threat to rock-wallabies is predation by feral animals, especially foxes, but feral cats also prey upon juveniles. Rock-wallabies rely on refuge caves and their nimbleness in rough terrain to escape predators, but foxes and cats are agile and cunning, often waiting at cave entrances to ambush wallabies. Where rock-wallabies once occupied most rocky habitat, fox and cat predation has now restricted them to only the most rugged areas.

In some places introduced herbivores compete with rock-wallabies for their rocky refuges and food, forcing rock-wallabies to use sub-optimal shelters and wander further to forage, thus exposing them to greater predation risk.



*Black-flanked Rock-wallabies have been reintroduced to Paruna*

*W. Lawler*

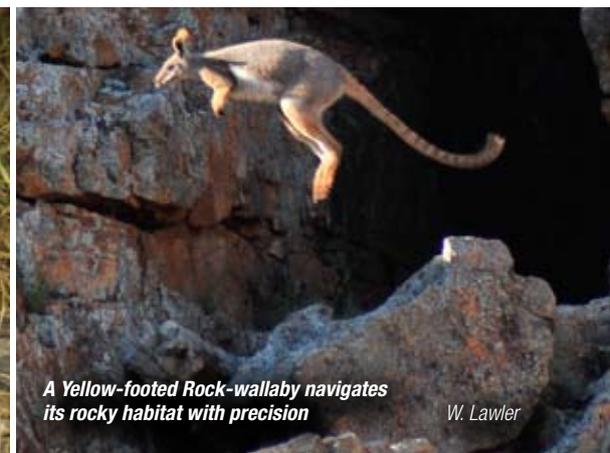
Goats are especially detrimental, but rabbits, donkeys, camels and domestic stock can also be harmful.

The isolation of colonies makes rock-wallabies sensitive to localised impacts on their habitat. For example, if a colony in one area is wiped out by the impacts of an intense fire or a prolonged drought, other rock-wallabies cannot recolonise the area easily. Dispersal between colonies is becoming increasingly difficult as the landscape between colonies is cleared or degraded, putting colonies at risk of inbreeding effects and eventual extinction. There are numerous cases of well-surveyed colonies going extinct even within the last decade. For example, Black-footed Rock-wallabies have quietly gone extinct from one of Australia's most iconic landmarks, Uluru-Kata Tjuta, an outcropping so isolated that there is no chance of wallabies recolonising from elsewhere.

Despite these threats, there is good potential for successfully protecting rock-wallabies. As they live in discrete areas, it is possible to implement heavily targeted conservation programs to reduce site specific threats such as introduced predators and herbivores. In addition, as AWC is demonstrating at Paruna Wildlife Sanctuary, translocations can play a critical role in helping to recolonise areas where rock-wallabies have become locally extinct.



*Sharman's Rock-wallaby captured by a remote camera trap on Mt Zero-Taravale*



*A Yellow-footed Rock-wallaby navigates its rocky habitat with precision*

*W. Lawler*



Yellow-footed Rock-wallaby and joey at  
Buckaringa Wildlife Sanctuary

W. Lawler

## AWC's role in conserving rock-wallabies

**Yellow-footed Rock-wallaby** (*Petrogale xanthopus*) were once harvested in the thousands for the fur trade and today persist in remote ranges in Queensland, NSW and SA. **Buckaringa** protects one of the largest populations of this nationally threatened species in the southern and central Flinders Ranges. A concerted program of goat control has reduced competition for food, and the range size of our Yellow-footed Rock-wallabies has decreased dramatically as a result (because they do not need to travel so far for food). This reduces exposure to foxes, while an ongoing fox control program provides extra protection.

**Godman's and Mareeba Rock-wallaby** (*Petrogale godmani / mareeba*) may both occur on **Brooklyn**, which sits on the boundary between these two species' ranges. These rock-wallabies form part of a recently evolved complex of *Petrogale* species that can only be distinguished by genetic analysis. The species complex is closely related to the Brush-tailed Rock-wallaby which has recently declined in NSW from what were thought to be secure populations, a reminder to never be complacent.

**Sharman's Rock-wallaby** (*Petrogale sharmani*) was only discovered in 1976. This species has one of the most restricted distributions of the eastern Australian rock-wallabies. It is restricted to the Coane and Seaview Ranges, north-west of Townsville. Listed as threatened by the Queensland Government, **Mt Zero-Taravale** accounts for nearly one third of its known range. It is regularly 'captured' during our systematic camera trapping surveys.

**Black-flanked Rock-wallaby** (*Petrogale lateralis lateralis*) have disappeared from large areas of south-west WA. AWC has successfully reintroduced this species at **Paruna**. Regular monitoring shows that the Paruna population is breeding and increasing in size. A research project to track dispersal between Paruna and the surrounding national parks, using population genetic techniques, is currently underway.

**Black-footed Rock-wallaby** (*Petrogale lateralis* – MacDonnell Ranges race) colonies have been quietly disappearing from isolated ranges in central Australia for several decades. Recent, comprehensive surveys of all rocky ranges on **Newhaven** have confirmed that populations exist on 5 out of 8 ranges. The fire management program at Newhaven now includes focused protection of these rocky ranges, and our feral predator monitoring is being adjusted to provide detailed information on fox densities around the ranges.

**Nabarlek** (*Petrogale concinna*) are a tiny rock-wallaby that was once well distributed across the Top End. However, recent surveys of previously occupied sites in the Northern Territory have identified a significant decline in the species. Nabarleks are vulnerable to predation by feral cats, and changed fire patterns may be accentuating this vulnerability by removing food and shelter. Fauna surveys at the **Artesian Range (Charnley River)** project will be carried out to confirm its presence there and provide an opportunity to understand and address this decline.

**Short-eared Rock-wallaby** (*Petrogale brachyotis*) populations exist at **Wongalara, Mornington, Marion Downs, Pungalina-Seven Emu** and the **Artesian Range (Charnley River)** project. They are among the most widespread of *Petrogale* species; they live in the vast landscapes of the tropical north, from the western Kimberley coast and across the Northern Territory to the Queensland border.

**Monjon** (*Petrogale burbidgei*) are protected at the **Artesian Range (Charnley River)** project (see pages 8-9).

# Updates from the field

## South-west region

**Karakamia** protects the only large population of Woylies in south-west Australia that is not in sharp decline. This highlights the critical importance of feral-proof fencing: the fox and cat-proof fence which surrounds Karakamia provides a secure environment for several hundred Woylies. Other populations which are not protected by a fence are in sharp decline. A major upgrade of the Karakamia fence is now underway to ensure it continues to provide secure protection for our valuable Woylies. The entire perimeter is having heavy ballast laid on the internal and external fence skirting. This will prevent water erosion and digging animals from creating entry points under the skirt.

At **Paruna**, the firebreak on the southern boundary has been upgraded to improve access and reduce response times for local volunteer fire brigades and AWC staff during bush fire emergencies. At **Mt Gibson**, AWC's first translocation of endangered plants is progressing well, with a recent survey confirming that three months after planting, over 99% of the 200 nursery-grown seedlings of *Acacia imitans* and *Acacia unguicula* had survived and established. Both species are Critically Endangered because of extremely restricted distributions, small populations and threats including grazing and fire; their translocation to Mt Gibson will help ensure their survival.



*Karakamia – The upgraded fence will ensure continued protection for threatened mammals*

K. Christian

## South-east region

In July, 40 Bridled Naitail Wallabies were released outside the feral-free fenced areas of **Scotia**. There are around 1,100 Bridled Naitail Wallabies remaining in Australia: of these, approximately 800 (over 70%) are protected by AWC within the 8,000 hectare fenced area at Scotia. If we can successfully establish a Bridled Naitail Wallaby population outside this fenced area, we will increase substantially the overall Australian population size. The July release of wallabies was the first in a series of staged releases, and followed a sustained and intensive control program for foxes over the southern 20,000 hectare section of Scotia. The results from the first release were mixed: animals that stayed near the release site had a reasonable level of survivorship, whilst animals that wandered further afield (including into areas which are not subject to intensive feral control) suffered high levels of mortality. Based on these results, we are planning a second release with modifications to increase the site fidelity of released animals.

The weed control program at **Buckaringa** marches on, with about two-thirds of the property now cleared of wheel cactus. Volunteers have been instrumental in this work, as well as making a raft of track repairs following the heavy rainfalls of the past year. The feral animal control programs are ongoing; the Sporting Shooters Association has continued their valuable contribution to the goat control work. The mallee trees of **Yookamurra**, near the Barossa, have been sparkling in the above average rain, and the reintroduced animals have been enjoying the good times too.

More than any other sanctuary, **Kalamurina** has enjoyed remarkable rainfall during 2010. The property on the north shore of Lake Eyre received 451mm for the year to mid November; astonishing, given that the average annual rainfall is 140 mm, and the highest annual total before 2010 was 316 mm. The Warburton has now flowed for well over a year. In this time of bounty, many species make hay – for example, the Long-haired Rats are in huge numbers, and the Black-shouldered Kites are hot on their tails... This is the first time that widespread rain has fallen on Kalamurina since it was destocked by AWC and the country has responded magnificently.



*Scotia – One of the released Bridled Naitail Wallabies with its radio-collar*

B. Yabsley



Newhaven – AWC carries out prescribed burns with Nyirripi community members and the Central Land Council

J. Schofield



Mt Zero-Taravale – Koala captured on camera trap



Mt Gibson – Jo measuring growth in a seedling of *Acacia imitans*

G. Barnett

## North-east region

Activities at **Piccaninny Plains** have focused on fire management and feral animal control, as well as the ongoing biological survey program. Nigel and Beth McGrath have recently joined the existing team as property managers. AWC staff at **Brooklyn** are in the final stages of the detailed vegetation mapping for the property. During their field work, they visited the noteworthy patch of Bunya Pines on the property – noteworthy because it is the most northerly population of this charismatic tree, and genetically quite distinct from the next most northern patch at Ravenshoe. The tallest Bunya on Brooklyn is a whopping 63 m tall and 4.8 m in girth – easily the biggest tree on the property.

Staying on the big tree theme, the tallest tree on **Mt Zero-Taravale** is a Flooded Gum, recently measured with a 7.8 m girth. It stands 50 m tall, but the top has been knocked off at some point by lightning, so its original height was much greater. A recent fauna survey in the woodlands of the sanctuary recorded 167 species of vertebrate, including 47 that were new confirmations for the property such as the Brush-tailed Phascogale; the total confirmed inventory now stands at 347 species. The volunteers from Birds Queensland have done a wonderful job of looking after bird-watching visitors to **Bowra** this year. At **Curramore**, Klaus' cheerful but unrelenting dedication to habitat restoration continues. We have passed the 50% mark with more than half the lantana now cleared from the sanctuary.

## Northern Territory and North-west region

**Newhaven** has also had a bumper year of rain, and the desert is green, lush and dripping with breeding birds. In the face of luxuriant grass growth, good fire management has been especially critical this year. An aerial burning program was supplemented with an on-ground burning program around key sites, carried out with members of the Nyirripi Community, and with support from the Central Land Council. 270 km of Newhaven's tracks were graded and cleared, partly to act as strategic lines for fire suppression during the summer, if necessary.

Once the annual musters and feral animal control program were successfully completed, roadworks were also a major project at **Wongalara**: a section of the access road that had been damaged during the last floods was resheeted. At **Pungalina-Seven Emu**, the Shadforth family completed this year's Parkinsonia weed control program, poisoning over 300 infestations from 59 km of the Calvert River.

# Optus and AWC

## Helping to Shape Our World

'yes'  
OPTUS

A new Optus-AWC initiative called **Shape Our World** is taking our partnership with Optus to a new level. By integrating Optus' leading-edge communication technology with AWC's knowledge of science and conservation, **Shape Our World** provides a powerful mechanism through which we can reach millions of people with our conservation message. The first phase of this initiative – an interactive, educational website – launched on 17 November 2010. Visitors to **Shape Our World** will learn about AWC's projects to save threatened wildlife and will have the chance to win a trip for four to Scotia Wildlife Sanctuary, where AWC has reintroduced six of Australia's rarest mammal species into the wild.

The next, state-of-the-art phase of **Shape Our World** is scheduled to launch in early 2011. We would love to see our committed supporters win the competition, so we encourage you all to visit [www.shapeourworld.com.au](http://www.shapeourworld.com.au)

In a further, impressive demonstration of their commitment to conservation, over 3,560 Optus staff recently participated in an Optus-AWC Fauna and Flora Photographic Competition and raised \$2,000 for AWC. The campaign also resulted in the publication of 50,000 Optus-AWC 2011 calendars. These calendars are now being distributed through all Optus stores nationally. 100% of the proceeds generated by the calendars will be donated to AWC in support of our Northern Australian Mammal Recovery Project. AWC is grateful to Optus and its staff for this wonderful gift for our wildlife this Christmas.



Mike Smith  
(Optus) launches  
the Optus-AWC  
2011 calendar



### Officeworks bags a win for wildlife

Since December 2008, Officeworks has donated profits from the sale of specially-designated reusable shopping bags to AWC. Officeworks' contribution – which has so far generated over \$80,000 for AWC - provides a double-win for the environment, allowing Officeworks' team members and customers the opportunity to support the conservation of Australia's threatened wildlife as well as reducing plastic bag waste going to Australia's landfill sites. AWC is grateful for Officeworks' ongoing commitment which is helping us make a difference where it counts – in the field.

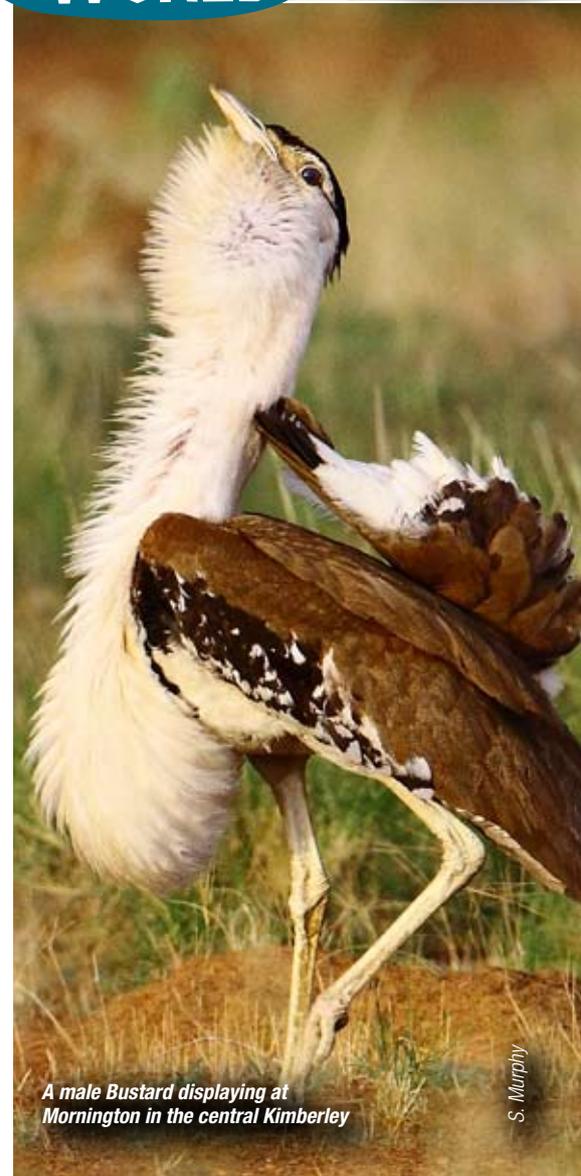
### The Nature Conservancy

AWC acknowledges the exceptional support of The Nature Conservancy (TNC) and the Thomas Foundation. Through the David Thomas Challenge and other programs, TNC has provided invaluable support for a range of AWC operations including at Wongalara, Kalamurina and other places, particularly in northern Australia.

### The Bilby Challenge: matching gifts to AWC

Under the Bilby Challenge, gifts to AWC of \$1,000 or more from new donors will attract a 50% match. For existing donors, gifts of \$5,000 or more will attract a match of either 25% or 50%. More details are on our website ([www.australianwildlife.org](http://www.australianwildlife.org)).

Inspired by the Thomas Challenge, the Bilby Challenge is a vitally important philanthropic initiative which will help your gift to AWC have an even greater impact where it counts: *in the field*.



A male Bustard displaying at  
Mornington in the central Kimberley

# Protecting the bandicoots of North Head

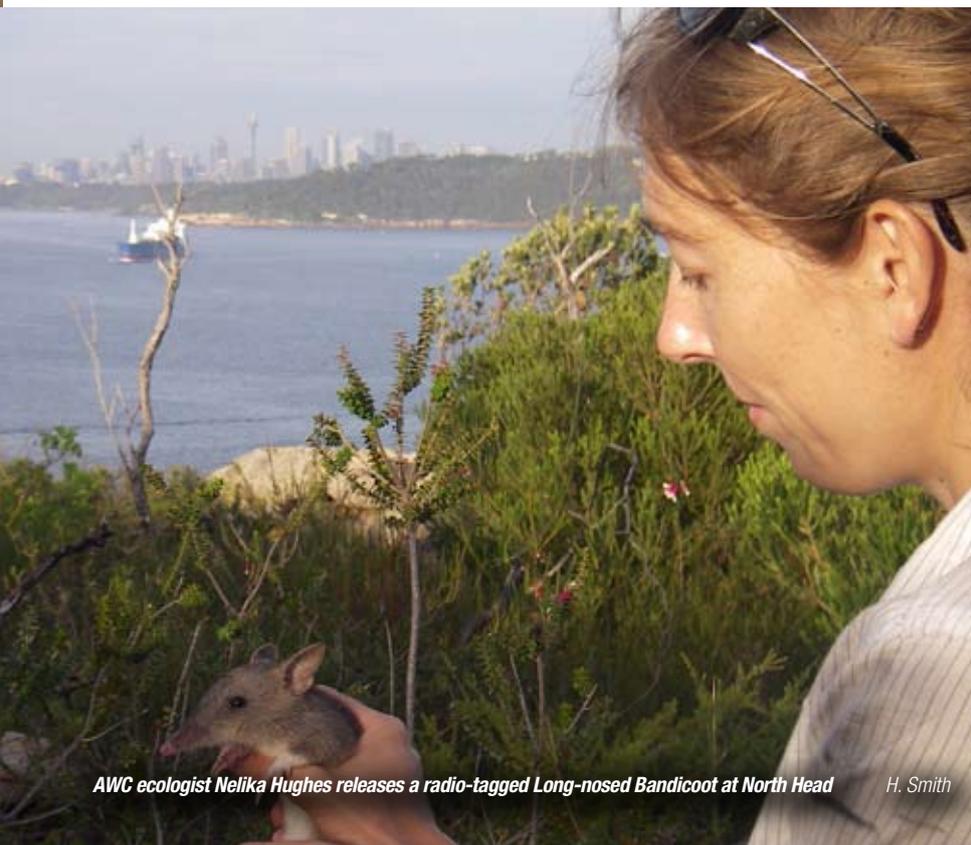
In recent decades, many native species have disappeared from the environs of Sydney Harbour, including from the important remnant bushland on North Head. However, a notable exception at North Head is the Long-nosed Bandicoot, which has learnt to exploit the modified vegetation of lawns and garden beds on the headland itself and the suburban backyards that fringe the headland.

Despite their ability to partially adjust to this modified environment, the North Head bandicoots are listed as an Endangered population; their numbers are few, and they are subject to ongoing threats, principally continued habitat degradation, predation by feral animals (cats, dogs and foxes), competition with introduced rats and fatalities from cars. Indeed, the population of bandicoots has shown signs of decline in the past six years, particularly in the southern part of the headland. In partnership with the Sydney Harbour Federation Trust, the NSW National Parks and Wildlife Service and other landholders, AWC has been carrying out research to better understand the causes of this decline and to devise an effective strategy to protect the bandicoots.

A critical step has been to investigate how bandicoots are ranging throughout the headland and its various habitats, and to link their movements to differences in habitat quality and food availability. To achieve this, we have carried out an intensive radio-tracking study of bandicoots in the two sub-populations that occur at North Head. Small radio-transmitters were attached to 28 Long-nosed Bandicoots during November and December 2009, the peak of the breeding season. Each bandicoot was tracked for four hours a night, over 6-13 nights within a three week period. Up to six individuals were tracked simultaneously each night, each of which had their own dedicated team of volunteer trackers recruited from AWC, the Sydney Harbour Federation Trust, Sydney universities, WIRES, and the local community. In total, almost 70 people volunteered their time, collecting data on more than 3,000 individual locations – a phenomenal effort!

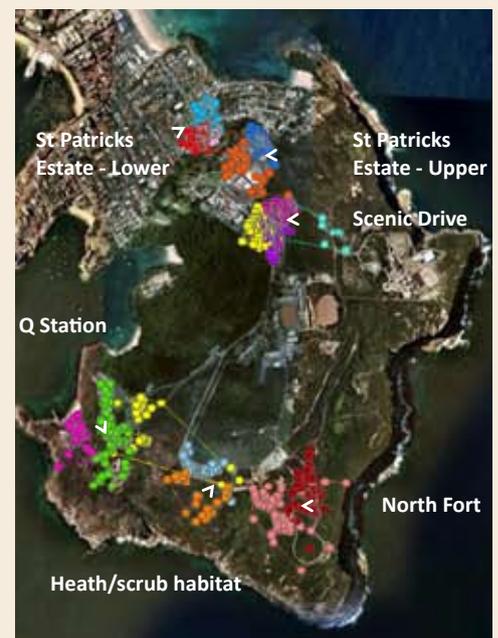
Preliminary analyses of this large dataset show that bandicoots in the south of the headland tend to have larger home ranges than those in the north (see map). This difference is likely driven by the south containing poorer foraging habitat, which means that southern bandicoots must travel further to gather enough food. Both the northern and southern populations have access to grassy areas, and our invertebrate surveys have shown that grassy areas and freshly mulched beds carry higher densities of invertebrates than other habitats on the headland. However, the grassy areas in the north are relatively less compacted, better-grassed, better-watered, and more liberally peppered with compost heaps, all of which make the north more lucrative real estate for a small marsupial that makes a living by digging for invertebrates.

The implications of this are that we can improve the survival prospects for the bandicoots on North Head by increasing the “invertebrate carrying capacity” of the grassy areas on the headland – for example, by reducing soil compaction and increasing infiltration. Management of some grassy areas will need to be adjusted accordingly. The next step in our research program is to determine how to improve the habitat quality of the native Banksia scrub on North Head, including through fire and hopefully the suppression of feral rats.



AWC ecologist Nelika Hughes releases a radio-tagged Long-nosed Bandicoot at North Head

H. Smith



Long-nosed Bandicoot home ranges: each individual has a unique colour; radio-tracking locations are shown as dots.

**The Bilby Challenge: matching your donations to help save Australia's threatened wildlife**

Please match my gift under the Bilby Challenge. Eligible gifts attract a 50% match.



**Artesian Range, Charnley River**

Please direct my donation to the Artesian Range, Charnley River.

**Wongalara**

Please direct my donation to the establishment of a feral herbivore-free area at Wongalara.

**AWC operations generally**

Please direct my donation to AWC operations around Australia.

▲ Newhaven is a joint project with Birds Australia  
 ● North Head is a collaboration with the Sydney Harbour Federation Trust  
 ■ Piccaninny Plains is a joint project with Tony and Lisette Lewis Foundation

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**Direct Debit Request**

I / We request that you draw by way of the Direct Debit System,  
 \$ \_\_\_\_\_ per month, for the payment of a monthly donation  
 to Australian Wildlife Conservancy Fund.  
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 Account Name: \_\_\_\_\_  
 Account Number: \_\_\_\_\_ BSB: \_\_\_\_\_  
 I / We acknowledge that this Direct Debit Request is governed by the  
 terms of the "Direct Debit Client Service Agreement" (set out below).  
 Signature: \_\_\_\_\_  
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**MONTHLY PLEDGE**

I wish to become a regular supporter and give a tax deductible donation  
**each month** of:  \$10  \$25  \$50 \$ \_\_\_\_\_  
Other (minimum \$10)  
 I wish to pay by:  **Direct debit from my bank account**  
Please fill in Direct Debit Request (see opposite).  
 **Credit card** - Please fill in details or call (08) 9380 9633.

**DONATION**

I would like to make a **single tax deductible** donation of:  
 \$100  \$300  \$1000  \$5000 \$ \_\_\_\_\_  
Other (minimum \$10)  
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 **Cheque/Money Order** - (enclosed)  
 Payable to the Australian Wildlife Conservancy Fund.

**Bequests**

I am interested in making a bequest in my will.  
 Please send me some information.  Please tick this box if you do NOT wish to receive news and information  
 on our latest initiatives and progress.

**Our Commitment to You, Drawing Arrangements:**

- We will advise you, in writing, the details of your monthly donation to Australian Wildlife Conservancy (amount, frequency, commencement date) at least 3 calendar days prior to the first drawing. Thereafter each drawing will be made on the 15th day of each month (or part thereof as specified).
- Where the due date falls on a non-business day, the drawing will be made on the next working day.
- We will not change the amount or frequency of drawings arrangements without your prior approval.
- We reserve the right to cancel your monthly donation to Australian Wildlife Conservancy if three or more drawings are returned unpaid by your nominated Financial Institution and to arrange with you an alternative payment method.
- We will keep all information pertaining to your nominated account at the Financial Institution, private and confidential.
- We will promptly respond to any concerns you may have about amounts debited to your account.
- We will send a receipt within 45 days of the conclusion of the financial year summarizing your entire year's gifts for tax purposes.

**Your Rights:**

- You may terminate your monthly donation to Australian Wildlife Conservancy at any time by giving written notice directly to us (PO Box 8070, Subiaco East WA 6008), or through your nominated Financial Institution. Notice given to us should be received by us at least 5 business days prior to the due date.
- You may stop payment of a monthly donation by giving written notice directly to us (PO Box 8070, Subiaco East WA 6008), or through your nominated Financial Institution. Notice given to us should be received by us at least 5 business days prior to the due date.
- You may request a change to the donation amount and/or frequency of the monthly donations by contacting us on (08) 9380 9633 and advising your requirements no less than 5 business days prior to the due date.
- Where you consider that a drawing has been initiated incorrectly (outside the monthly donation to Australian Wildlife Conservancy arrangements) you may take the matter up directly with us on (08) 9380 9633, or lodge a Direct Debit Claim through your nominated Financial Institution.

**Your commitment to us, Your responsibilities:**

- It is your responsibility to ensure that sufficient funds are available in the nominated account to meet a drawing on its due date. (You may be charged a fee by your Financial Institution if the account details are incorrect or there are insufficient funds in the nominated account when we attempt to deduct donations.)
- It is your responsibility to ensure that the authorisation given to draw on the nominated account, is identical to the account signing instruction held by the Financial Institution where your account is based.
- It is your responsibility to advise us if the account nominated for transactions with the Australian Wildlife Conservancy Fund is transferred or closed.
- It is your responsibility to arrange a suitable alternative payment method with us if the Australian Wildlife Conservancy Fund drawing arrangements are cancelled either by yourselves or by your nominated Financial Institution.
- Please enquire with your Financial Institution if you are uncertain whether direct debit functions are available on your account. (You may be charged a fee by your Financial Institution if the direct debit facility is not available on your account.)



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