



wildlife matters

australian



wildlife
conservancy

Winter 2010



The collapse of
northern mammal
populations

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 2008/09, 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 Northern Quoll is one of the small mammals in decline across Northern Australia. (Photo: W. Lawler)

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As regular readers of *Wildlife Matters* will be aware, AWC is striving to develop and implement a new model for conservation. Our model – with its focus on practical, on-ground action informed by good science – is being rolled out across northern Australia at places like Pungalina, Wongalara, Piccaninny Plains and Mornington. At Mornington, we have already seen an increase in the abundance and diversity of small mammals: the only protected area (government or private) in northern Australia where this has been recorded.

However, we need your help to continue our work at Mornington and to replicate its success across the north. The next few years will be critical. Therefore, we are delighted to announce the \$4 million Bilby Challenge, under which eligible donations to AWC for our northern mammal program – and our other programs in southern and central Australia – will attract a 50% match. The Bilby Challenge is a major initiative, inspired by the pioneering David Thomas Challenge and made possible by the extraordinary generosity of an AWC donor. We hope that, with your support, it will provide a substantial boost to our conservation efforts over the next 12 months and beyond.

Whether it is at Mornington, Scotia, Faure Island or one of our other 21 sanctuaries, your support has helped AWC demonstrate that it is possible to protect and restore populations of threatened species. The proposed establishment at Mt Gibson of the largest feral-free area on the Western Australian mainland (see pages 10-13) is set to provide further evidence of this. Thank you for your ongoing support. I hope you are able to take advantage of the Bilby Challenge and perhaps visit one of our sanctuaries to see first-hand the difference that you are making.

Atticus Fleming
Chief Executive

The Bilby Challenge: matching your gifts to AWC

A generous supporter is making one of the most significant philanthropic contributions to conservation in Australia by teaming with AWC to establish the **Bilby Challenge**. A total of **\$4 million** is being gifted to AWC: however, as part of the Bilby Challenge, these funds will be drawn down by AWC only as eligible matching funds are provided from new and existing donors.

The Bilby Challenge has been inspired by the need to take decisive on-ground action to reverse the decline in Australia's wildlife and habitats. It is designed to help AWC continue our groundbreaking work in developing and implementing a new model for conservation – a model based on good science and practical on-ground action delivering effective conservation for wildlife around Australia. The funds raised by the Challenge will be used to manage our existing properties, build the capacity of the organisation and undertake important new projects such as the Northern Mammal Project (see pages 4-9) and the Mt Gibson Fauna Reconstruction Project (see pages 10-13).

Launching the Challenge: gifts in June 2010

In June 2010, to celebrate the launch of the Bilby Challenge, 50% of every gift to AWC by an individual will be matched. This includes gifts by foundations or trusts that are the giving vehicles for individuals or families. The only exception is that gifts which are already attracting a match under another program (eg, Bowra, Thomas Challenge) will not be matched by the Bilby Challenge. In addition, the amount provided by the Bilby Challenge for any individual donor will be capped at \$250,000 (eg, gifts of more than \$500,000 will attract a match of \$250,000).

Why is it called the Bilby Challenge?

Many of you will be aware that the AWC logo is the Lesser Bilby (*Macrotis leucura*). The Lesser Bilby was last seen in South Australia in the 1930s although a skull of unknown age was recovered from under a Wedge-tailed Eagle's nest in 1967. The Lesser Bilby is now listed as extinct. The Bilby Challenge is designed to help provide a more secure future for our threatened and declining wildlife so that other species may avoid the fate of the Lesser Bilby.

The Bilby Challenge in 2010/11

In the next financial year (2010/11), the Bilby Challenge will operate as follows for all gifts by individuals (including associated foundations and trusts):

For new donors: all gifts of \$1,000 or more will earn a 50% match.

For existing donors:

- The donation of a previously pledged gift of \$5,000 or more will attract a 25% match.
- A donation of \$5,000 or more (not previously pledged) will attract a 25% match if the gift represents a continuation of the general level of giving by that donor.
- A gift of \$5,000 or more will attract a 50% match if it represents a significant increase in the general level of giving to AWC by the donor.

The maximum amount provided by the Bilby Challenge in 2010/11 for any individual donor will be capped at \$250,000.

To make a donation, please complete the form within the newsletter or donate securely online at www.australianwildlife.org



Lesser Bilby

P. Schouten

AWC acknowledges the inspirational example set by David and Barbara Thomas, who established the \$10 million Thomas Challenge, implemented through The Nature Conservancy (TNC). The Thomas Challenge, building on an earlier TNC program (the Wilson Challenge), has helped to substantially increase the level of environmental philanthropy in Australia. The leadership demonstrated by the Thomas Foundation and TNC helped inspire one AWC donor to offer a \$500,000 matching grant to assist with the acquisition of Bowra and has now helped inspire the establishment of the Bilby Challenge. We hope the Bilby Challenge will lead to further growth in the level of support for private, non-profit conservation in Australia.

Where have all the mammals gone?

The extinction crisis in northern Australia

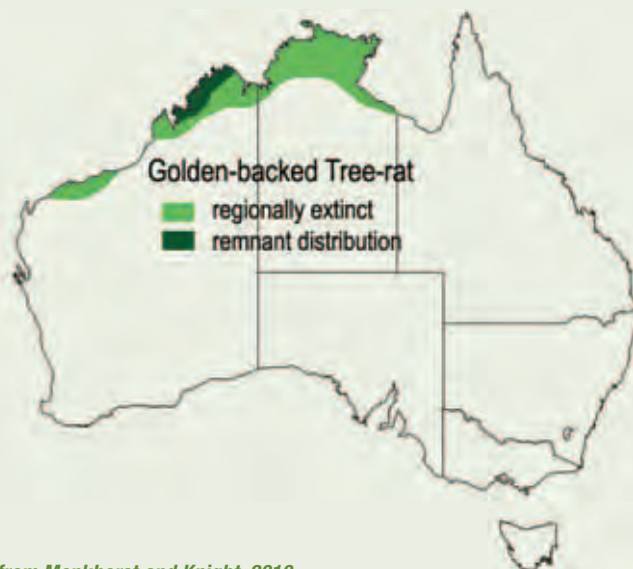
In the past 10-20 years, there has been a catastrophic decline in the diversity and abundance of small mammals across northern Australia. From Cape York to the Kimberley, small mammals are disappearing. Urgent intervention is required to prevent a wave of mammal extinctions across Australia's tropical savannas.

Three years ago a team of AWC ecologists was carrying out a fauna inventory survey at a prospective property in the Northern Territory, to assess its conservation value for possible acquisition. Over two weeks, we set traps at a range of remote locations, accessible only by helicopter. The survey sites were positioned in combinations of topography and vegetation that seemed guaranteed to deliver high densities of several mammal species. But night after night, the traps were empty. Amongst complex sandstone formations that should have been choked with Rock Rats and Northern Quolls, the team found sand swept clean by the dry season winds, with no mammal tracks at all. In lush paperbark forests, the rich loamy soil should have been pockmarked with the characteristic diggings of Bandicoots, but the survey team saw and caught nothing. Long-tailed Planigales were absent from the blacksoil plains, and native rodents absent from the savanna woodlands and the creek banks. In over 1050 trap-nights, we caught only two species of native small mammal - a demoralising experience.

Sadly, this survey experience is not unique. Small to medium-sized mammals have vanished from vast areas of the north including some of Australia's most famous national parks. We know this unequivocally: a growing body of unpublished survey reports and published research from across the north now provides compelling evidence of a dramatic collapse in mammal populations.

A common theme is that species' distributions are retracting westwards and northwards. For example, Golden-backed Tree-rats once extended from Broome in the west (where they were familiar inhabitants in the roofs of people's houses), through the central Kimberley to the east side of the Top End. However, this acrobatic Australian rodent now persists only in the northwest fringe of the Kimberley coast (see map), a tiny proportion of its former range.

Distribution of the Golden-backed Tree-rat



Adapted from Menkhorst and Knight, 2010

Even for those species whose distributions have not contracted to the north and the west, a large number have declined dramatically in abundance across their range. The overall impact has been catastrophic. To illustrate the scale of this extinction crisis, several species are now extinct, or nearly so, from the mainland of the Northern Territory. As well as Golden-backed Tree-rats, this list includes Northern Quolls, Golden Bandicoots and Brush-tailed Rabbit-rats (recent detailed research predicts that Rabbit-rats will be gone from the Northern Territory within 10 years).

The situation is perhaps most poignantly demonstrated by the results from a long-term monitoring program in the world heritage-listed Kakadu National Park, the largest and most famous protected area in northern Australia. Kakadu's iconic status – and its substantial budget (more than \$18 million for operating costs in 2008/09) – has not protected its native mammals. In the past 15 years, the abundance of small mammals in Kakadu has declined by three-quarters, and the number of species recorded has declined by two-thirds (see graphs on page 5).



Golden-backed Tree-rat

Wildlife Images



Brush-tailed Rabbit-rat

ILLUSTRATED BY WILSON B. L. JONES

J. Gould, National Library

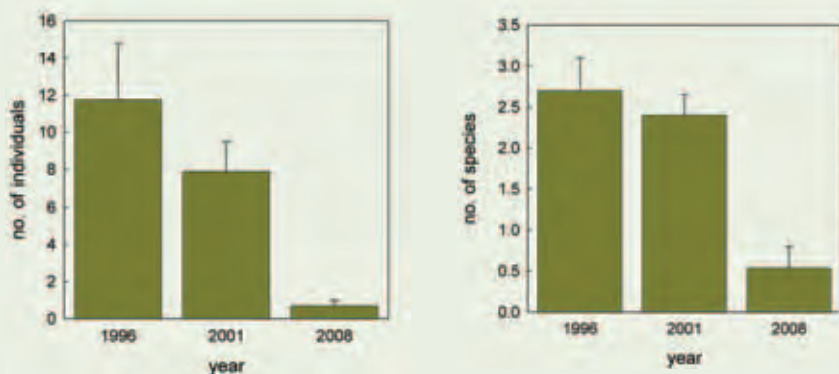
The experience at Kakadu National Park highlights the desperate need for an urgent and comprehensive re-evaluation of the approach to conservation in northern Australia. Despite an on-going annual investment of more than \$18 million, the natural capital of Kakadu is being severely diminished. Kakadu is not an isolated case: it is representative of much of northern Australia. However, the example of Kakadu suggests that funding is not the key issue: we need new strategies and more effective implementation. Business as usual – even with more funding – will mean a new wave of mammal extinctions in northern Australia.

Have we learnt from the previous wave of mammal extinctions?

We have seen these signs of faunal collapse before in Australia, and they were precursors to extinction. Within 200 years of European settlement, Australia lost 24 species of small to medium-sized mammal primarily from the semi-arid and arid areas of the Australian mainland: the planet's highest rate of mammal extinction in the past 400 years. Many surviving mammal species experienced severe declines in either distribution and/or density during this period, and some of these are now found only on offshore islands. Each species disappeared over very short time frames, sometimes within 20-30 years. For many of these species, we did not know what was happening (or why) until it was too late.

This experience in southern and central Australia provides a preview of what is to come in the north, unless we act now. The declines in northern Australia's mammal fauna are following a similar pattern to the earlier arid and semi-arid zone extinctions – for example, the northern declines have also occurred rapidly (in the past 15 or so years), and affected small to medium sized mammals that live in vast, relatively unmodified landscapes. It appears we are about to rewrite our own record for mammal extinctions. The key difference is that this time we know what is coming and we have the opportunity and the ability to prevent the impending extinctions. This time, there is no excuse: whether a species like the Golden-backed Tree-rat survives, or is lost forever, is in our hands. Future generations will judge us far more critically than we can ever judge the land managers who witnessed the previous wave of mammal extinctions.

The Decline of Mammals in Kakadu National Park



The abundance (far left) and species richness (left) of small mammals from a set of permanent monitoring sites at Kakadu National Park. The bars show the average (and standard errors) for numbers of animals and species per site. Reproduced with permission from *Wildlife Research* 37(2): 116-126 (J.C.Z. Woinarski et al.). Copyright CSIRO 2010. Published by CSIRO PUBLISHING, Melbourne Australia.

Why are our northern mammals disappearing?

Superficially, the tropical savannas of northern Australia appear intact. There has been very little clearing of vegetation. However, there are several factors which we know are having a profound influence on the ecological health and functioning of our northern savannas. These factors appear to be driving the decline of mammal populations. We do not yet fully understand how these factors are affecting mammal populations, or the relationship between these issues, but we are confident that the primary causes of the mammal decline are:

- Altered fire regimes (especially an increase in extensive and intense wildfires).
- Grazing by feral herbivores (especially feral cattle, buffalo, donkeys and horses).
- Predation by feral cats.

Weeds, disease and cane toads probably interact with, and compound the pressures from, altered fire and introduced species but, at this stage, there is no evidence to suggest they are the primary culprits.

Altered fire patterns

Fire is a natural ecological process in the tropical savannas. Profuse grass growth during the wet season cures during the dry season to become a large flammable biomass that is easily ignited by lightning. Aboriginal people supplemented lightning fires with 'management' fires - lit for hunting, to ease travel, for ceremony, and 'to clean up country'. Under this management system, fire patterns were probably dominated by small fires, distributed patchily in time and space. However, over the past few decades, Aboriginal fire management has been replaced in many regions by a contemporary pattern of extensive mid-to-late dry season fires that recur in the same place every 1-3 years. These fires are ignited, accidentally or deliberately, by many different people: prospectors, cattle musters, young men or women in remote communities, tourists and others.

In other words, many parts of northern Australia now experience more extensive, more intense and more regular fires than they did when Aboriginal people managed the landscape traditionally.

This "new" fire regime reduces the structural and floristic complexity of vegetation, reduces the availability of key food resources (nectar, seed) and removes habitat for animals.

Extensive, intense fires also accelerate erosion, and promote the spread of weeds. Some weeds, especially some of the introduced pasture grasses, have very luxuriant growth, and thus burn even more intensely and frequently, setting up a self-promoting cycle of ecological change.

Many species of plants and animals are particularly disadvantaged by regular extensive and intense fires – obvious casualties are fire sensitive plants like heath, Cypress Pine and the vegetation along creeks and in moist gullies; animals that are specialists of this vegetation are also affected. Animals that rely on a healthy and complex ground, grass and/or shrub layer for food or shelter are also vulnerable; our native mammals fall into this category.

The sensitivity of small to medium-sized mammals to fire has been confirmed by recent research. In Kakadu, the species richness and abundance of mammals declined at monitoring sites that were exposed to frequent fires. At AWC's Mornington Sanctuary, mammal abundance as well as species richness declined after an extensive, intense fire in the north of the property.

Large introduced herbivores

Introduced large herbivores are found across northern Australia in all tenures, including national parks, and usually at high densities. Cattle, horses, donkeys and pigs are widespread; swamp buffalo, banteng and various species of deer have more limited distributions.

Introduced herbivores affect native mammals in several ways. Trampling and soil compaction makes life harder for animals that live under the surface (like planigales) or which dig into the soil. Grazing reduces grass and seed available to native mammals for food and shelter and also simplifies the structure of vegetation, again reducing food availability and also increasing exposure to predators.

Research from the savannas in Africa and North America has shown that small mammal abundance and species richness are reduced in the presence of large herbivores. Surprisingly, there has been very little research in Australia on the impacts of grazing. AWC recognised the importance of conducting additional research on this issue and, in particular, examining the impacts of destocking at a landscape-scale over several years. To this end, we destocked almost 40,000 hectares at Mornington for the purposes of such an experiment. There are very few – if any – other large-scale feral herbivore-free areas in northern Australia. The results of our experiment show that small mammal abundance doubled with the removal of cattle, horses and donkeys. This is a vitally important study: it provides critical information on the role of feral herbivores in the mammal decline and it demonstrates that, at least under some conditions, the recovery of mammals can be achieved (see pages 8-9).



The effect of an extensive, late season fire

S. Legge



Pale Field Rat remains from feral cat stomach

M. Kennedy



Feral cat captured on a camera trap at Mornington

Feral cats

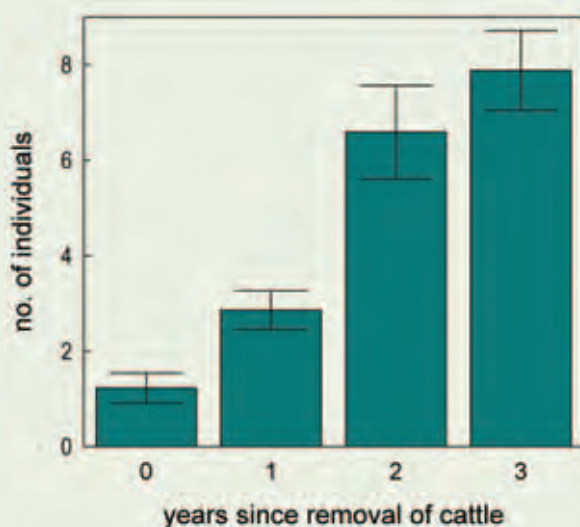
Cats and foxes are considered the primary protagonists in the mammal extinctions of Australia's arid and semi-arid zones. Although foxes are absent from the tropics, cats are ubiquitous across the northern savannas. Unlike altered fire regimes and feral herbivores, the impact of cats on small mammals is direct – they eat them!

The role of cats in northern Australia has perhaps been understated in recent years. Our research at Mornington Sanctuary suggests that feral cats have an average home range of around 300 hectares. We know from the research of others, and our own analysis of cat stomachs, that each cat kills at least 5 native animals (mammals, birds, reptiles, frogs) every day, and often more.

Extrapolated across the north, feral cats are killing 2 million native animals every day in northern Australia.

Cats are having a substantial impact on mammal populations. This is reinforced by the fact native mammal species that have plummeted on the mainland have survived at relatively high densities on cat-free islands; conversely, island mammal populations have suddenly crashed on islands where cats were recently introduced.

The recovery of mammals at Mornington Wildlife Sanctuary



The abundance of small mammals from a set of permanent monitoring sites following the removal of introduced herbivores from a 40,000 ha area of Mornington Sanctuary. Bars show the average number of mammals captured at a site and the standard errors.

How do cats, fire and feral herbivores interact – is there a primary culprit?

No single threat in isolation provides sufficient explanation for the mammal declines in northern Australia. For example, the response of mammals to fire can be inconsistent: the declines do not always coincide with the timing of changed fire patterns, and mammal declines have been documented from areas with infrequent fire. Similarly, introduced herbivores and cats have been present in most parts of northern Australia for over a hundred years, which doesn't correspond with the current catastrophic mammal declines.

There are several explanations for this:

- The geographic and taxonomic pattern of mammal declines makes it likely that the relative contribution of each threat varies uniquely depending on the species and location.
- Over time, the cumulative pressure from these main threats may reduce the resilience of the system as a whole, so even a relatively minor disturbance can 'tip' the balance.
- The threats probably interact synergistically. For example, grazing and mismanaged fire reduce the amount of cover available for small mammals which could make them more vulnerable to predation by feral cats.

We know that business as usual for conservation in the north is no longer an option if we wish to prevent the ongoing decline and extinction of small mammal species. Immediate action is required to address the key threats of altered fire regimes, cats and feral herbivores and to further understand how these factors interact. For this reason, AWC is developing and implementing an intensive program across our northern sanctuaries – **AWC's Northern Mammal Recovery Project** is described on the following pages.

AWC's Northern Mammal Recovery Project



A Common Rock-rat at Mornington

S. Murphy

At Mornington Wildlife Sanctuary, AWC has demonstrated that active land management can deliver an increase in small mammal diversity and abundance. It is the only protected area in northern Australia where a recovery in mammal populations has been recorded. The Mornington results are extremely encouraging. However, it is critical that we find out whether we can reproduce this recovery at other sites, both to test the generality of the response across different regions, and also to help us understand the interactions between fire, cats and feral herbivores.

AWC's Northern Australia Project will seek to replicate the Mornington model by implementing a series of large-scale land management interventions at eight AWC properties located in each key region from the Kimberley to Cape York (see map on page 9). At each site, the Project combines an **active land management** response with an **integrated research** program addressing the key threats.

The scale of the Northern Mammal Project is groundbreaking: the size of each site, the ecological gradients represented across the project sites and the range of history/treatments for fire, feral herbivores and cats mean this project is of national significance. The Project weaves together AWC's commitment to science and land management by integrating immediate on-ground management activities with research projects designed to inform future land management decisions.

Addressing the impact of feral herbivores

Our Northern Mammal Project will involve creating large feral herbivore free areas at five of our sanctuaries across northern Australia and measuring the response of native fauna at each of these sites. Replication at several sites is essential to give us confidence that the recovery witnessed at Mornington, the only protected area in northern Australia containing a large feral herbivore-free area, can be reproduced elsewhere.

Our project will therefore be unique in creating a network of large feral herbivore-free areas across the north.

The five sanctuaries at which feral-herbivore free areas will be established are: *Mornington (stage 2)*, *Marion Downs*, *Wongalara*, *Seven Emu* and *Piccaninny Plains*. A minimum of 40 permanent monitoring sites will be established at each property to test the response of small mammals, representing an annual trapping effort of a minimum of 37,000 trap-nights.

Addressing the impact of altered fire regimes

We will implement active fire management across our eight northern Australian properties, including management prescriptions designed to protect and improve habitat for small mammals. On each property, the over-riding fire management principle will be to reduce the incidence of extensive, intense fires: burn plans will be based on a careful analysis of previous fire histories, and designed to meet clearly articulated spatial and ecological targets.

At each property, half of the monitoring sites will be in unburnt vegetation, and the remaining half in burnt vegetation. On the five properties with feral herbivore-free areas, we will compare the effect of our fire management within the feral-free area with the effect outside the feral-free area to examine how these threats interact.

Addressing the impact of feral cats

Cats pose a particular management challenge as there are no options available for broadscale cat control - they are extremely difficult to trap, and they avoid bait. A growing body of evidence suggests that Dingoes may be effective at suppressing cat populations; the best control for cats, therefore, may be to encourage a robust Dingo population. It may also be possible to limit the impact of feral cats by manipulating fire and feral herbivore populations. To answer these questions, we urgently need better information on the impacts of feral cats, how cats interact with fire patterns and introduced herbivores and whether Dingoes can provide an effective biological control.



● Properties with feral herbivore-free areas ●● Properties included in a correlational analysis

The scale of AWC’s Northern Mammal Project is unique. AWC will be carrying out a massive correlational study across eight properties spread between the Kimberley and Cape York Peninsula. Each property has different:

- herbivore densities; and
- fire histories.

The gradients of stocking and past fire histories will help tease apart how these two threats interact to impair small mammal populations.

In addition, we will also be carrying out landscape-scale experiments of herbivore control within five properties, or replicates, between the Kimberley and Cape York Peninsula. Each property-scale experiment will involve collecting data on fauna communities in both the experimental (ie. the destocked) as well as the control (stocked) areas before the herbivore control, as well as after it.

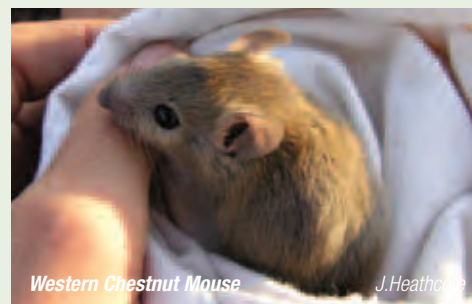
The Northern Mammal Project will address the impact of feral cats by:

1. Investigating the relationship between Dingoes, cats and small mammals by measuring the density of Dingoes, cats and native fauna across AWC’s eight northern properties, plus additional sites in national parks, to examine if cats are scarce where Dingoes are common, and whether native mammal populations benefit as a result.
2. Quantifying the impact of cats by reintroducing populations of small mammals (Pale Field Rats) into areas that are cat-free (encircled with predator-proof fencing) and at sites where cats remain (ie unfenced plots), then comparing the survival, behaviour and breeding of the reintroduced mammals.
3. Carrying out focal research on cats to describe and understand their ecology, including how they respond to, and interact with, other threats like fires and the presence of herbivores. We will examine the ranging behaviour, diet, and impact of cats in areas of the property with/without large herbivores, and that have been burnt/not burnt, with the help of GPS tracking collars and other new technologies.

Our partners in northern Australia

We are working with a wide range of partners in northern Australia. Our neighbours – pastoralists and indigenous communities supported by the Land Councils – provide vital advice, support and assistance. The Australian Research Council is funding part of the research activity: our partners in the ARC-funded components include James Cook and Charles Darwin Universities, CSIRO, NT Department of Natural Resources, Environment, the Arts and Sport, WA Department of Environment and Conservation and the Qld Department of Environment and Resource Management, all of whom also work closely with AWC on other elements of the Project. Other important partners include The Nature Conservancy and the Pew Environment Group. Our Northern Mammal Project is complementary to a range of activities and projects being undertaken by our partners and other organisations.

How can you help?



Western Chestnut Mouse J.Heathcote

We need your help to implement the Northern Mammal Recovery Project and provide a more secure future for the threatened mammals of northern Australia. Our Project is unique because of its scale, the creation of a network of feral herbivore free areas and the focus on feral cat control.

The Bilby Challenge (see page 3) has been established to help raise the funds required for projects like the Northern Mammal Recovery Project. Your donation to AWC will be matched (50%) under the Bilby Challenge. Please help us provide a more secure future for the mammals of northern Australia.

Mt Gibson Fauna Reconstruction Project

While the mammals of northern Australia cling precariously to survival (see previous pages), a wave of extinctions has already crashed across central and southern Australia. Many areas are now “marsupial ghost towns”, to use a phrase coined by Tim Flannery. Our strategy in southern and central Australia has been to establish large feral predator-free areas into which threatened mammals can be reintroduced and wild populations restored, whilst continuing to work on landscape-scale feral animal control strategies outside these highly secure areas. With populations safeguarded at places like Scotia and Faure Island, we are now set to embark on a major project that will further expand our feral-free estate and dramatically improve the prospects for survival for several threatened mammal species.

Why is Mt Gibson Wildlife Sanctuary so important?

Mt Gibson covers over 130,000 hectares (321,000 acres) of semi-arid ecosystems in south-western Australia. The property is particularly significant because it protects a large uncleared area of the Avon Wheatbelt bioregion including over 50,000 hectares of diverse eucalypt woodlands such as Salmon Gum, York Gum and Gimlet communities. Elsewhere throughout the wheatbelt, these woodlands have been extensively cleared. Mt Gibson contains the largest remaining areas of several woodland types, including some eucalypt communities that are not represented in any other protected areas.

Mt Gibson lies on a transitional vegetation zone often called the “mulga-eucalypt” line, and straddles two bioregions (Avon Wheatbelt and Yalgoo) and two botanical provinces - the semi-arid Eremean province (extending inland), and the moister South-west province (which extends to the coast). This location, together with the property’s highly variable topography, gives Mt Gibson an extremely rich flora and fauna, and makes it an important refuge for threatened species.

Over 140 bird species, and over 70 reptiles and frogs have been confirmed from Mt Gibson, including species like the nationally threatened Malleefowl and the Gidgee Skink. The mammal inventory includes four species of Dunnart – this is a high number of species from the same group, and is a consequence of the position of Mt Gibson in a transition zone. Overall 21 mammal species have been confirmed on the property, including the threatened Chuditch (Western Quoll). Before the arrival of feral animals, however, the mammal fauna of Mt Gibson would have been much richer.

What has happened to mammals in south-western Australia?

As is often cited in *Wildlife Matters*, Australia has the worst mammal extinction rate in the world, with 24 native mammals having disappeared forever. Twenty one of these mammal extinctions were on the mainland, concentrated in the central and southern parts of the continent in areas of low-moderate rainfall. The factors that have propelled this extinction crisis have been feral predators (foxes, cats), competition with feral herbivores (rabbits, goats, sheep and cattle) and the destruction of habitat through vegetation clearance.

The impact on the fauna of south-western Australia – particularly the wheatbelt and adjacent arid zone – has been catastrophic. The region that includes Mt Gibson has lost up to 18 mammal species, which is as high a rate of attrition as anywhere on the Australian continent.

We have had to “look back in time” to piece together a picture of the original mammal community at Mt Gibson. Like a sleuth dedicated to solving a long-forgotten murder mystery, biologist Alex Baynes has conducted an extensive search for subfossil remains (bones, regurgitated owl pellets, etc) in caves, hollow trees and from the ground surface at Mt Gibson: the results reveal that Mt Gibson was once home to an extraordinary assemblage of mammals.

Some species which once frequented Mt Gibson are gone forever – the Crescent Naittail Wallaby, the Pig-footed Bandicoot and the Lesser Stick-nest Rat are now extinct and can never be reintroduced. However, it is not too late for a number of other species that have disappeared from the Mt Gibson region but which have survived in small numbers on offshore islands or in fenced areas elsewhere on the mainland.



The Woylie is a nationally endangered species which we intend to reintroduce at Mt Gibson

W. Lawler

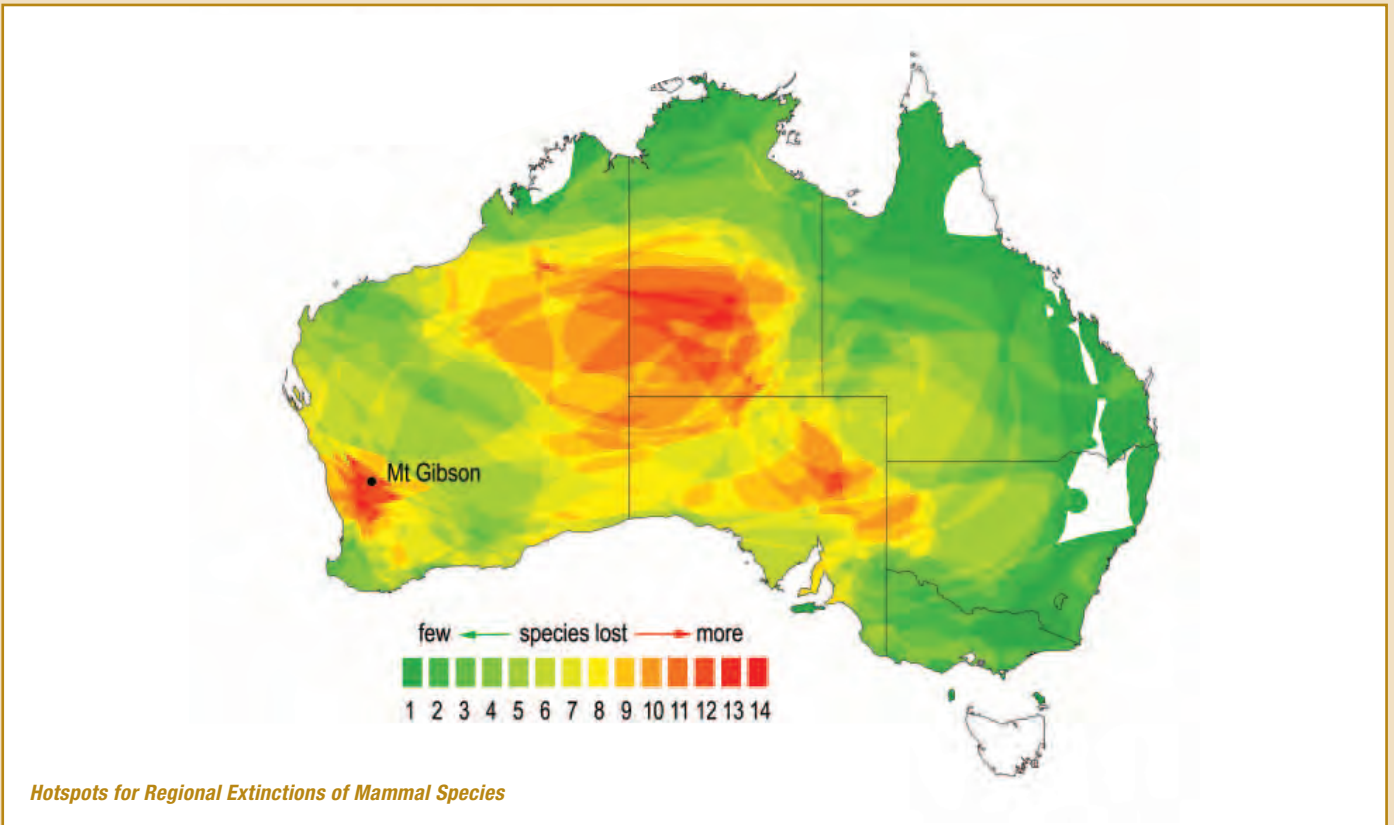
Hotspots for regional extinctions of mammal species

This map identifies those areas of Australia that have lost the highest number of threatened mammals. Extinct mammals (eg the Lesser Bilby) are not included in the analysis. It has been prepared by overlaying the pre-European distributions of more than 50 nationally threatened mammal species (excluding bats) which have experienced large range contractions. The current (refugial) distribution for each species is excluded; in other words, the map overlays the areas from which each threatened species have disappeared.

As the numbers of these areas accumulate at a given location, that location is shaded towards the red end of the spectrum (denoting high rates of regional extinction) rather than green (lower rates of regional extinctions). White areas on the map (such as the northwest Kimberley, Tiwi Island, Northern Cape York, etc) denote areas where there are no confirmed regional extinctions for these 50 designated species, although in some cases the density of one or more species may be extremely low. The resolution of this map will be improved over time by refining the estimates for each species' previous distribution.

The map does not include species that have experienced large range contractions but are not yet listed as nationally threatened (there is often a lag of many years before a declining species is officially listed). Incorporating these species will highlight the unfolding extinction crisis in northern Australia, where many species are not yet listed despite large declines.

Nevertheless, the map clearly illustrates three epicentres of regional extinction - in the Tanami-Great Sandy-Gibson deserts, to the south and east of Lake Eyre, and in the northern wheatbelt of WA. Mt Gibson is situated in the northern wheatbelt epicentre, highlighting its importance as a site for a mammal restoration program.



Mt Gibson contains vast areas of rare woodland communities

W. Lawler

Mt Gibson Fauna Reconstruction Project

Which mammals will AWC return to Mt Gibson?

Up to 14 mammal species are potential candidates for reintroduction at Mt Gibson, based on our knowledge of their former distribution and habitat preferences. We have further refined this list by balancing the conservation gains achieved from a successful reintroduction against the potential risks and constraints. This analysis has generated a shortlist of nine species for reintroduction at Mt Gibson. Generally, we have identified as priorities those species that are highly threatened and most likely to thrive in the habitats of Mt Gibson (eg Western Barred Bandicoot, Banded Hare-wallaby), especially if AWC does not conserve them elsewhere (eg Red-tailed Phascogale). Species that may compete with higher priority species (eg Boodies may outcompete Woylies), or which AWC already conserves effectively at other locations, are not initial priorities.

Priority species for reintroduction at Mt Gibson

- Woylie
- Western Barred Bandicoot
- Red-tailed Phascogale
- Banded Hare-wallaby
- Shark Bay Mouse
- Greater Stick-nest Rat
- Brush-tailed Possum
- Numbat
- Greater Bilby

As AWC's reintroduction program grows, our objectives are becoming more sophisticated. Four AWC sanctuaries now have feral-free areas, each with up to seven reintroduced mammal species. As the total feral-free estate increases, the focus of our Reintroduction Program shifts towards ensuring that any one species is represented at more than one sanctuary (for 'insurance' reasons), and that the overall population across sanctuaries is large enough to allow long-term genetic management (we can mitigate against genetic issues caused by small population sizes at any one sanctuary by regularly moving animals between sanctuaries: for example, Woylies may be exchanged between Mt Gibson and Karakamia). In other words, our emphasis is on the *effective conservation of each reintroduced species, rather than just representation.*

Do we need a feral proof fence at Mt Gibson?

If we are to restore the mammal community at Mt Gibson, we must implement a strategy that protects reintroduced populations from the critical threats to their survival – especially foxes, cats and feral herbivores. AWC's track record in this area is unparalleled: we manage more feral predator-free land than any other organisation on mainland Australia. In addition, we have translocated over 2,200 animals of 19 threatened and declining species, both into, and out of, AWC sanctuaries.

At Mt Gibson, we have invested substantial time and resources considering whether it is possible to undertake a reintroduction program in the absence of a feral-proof fence. Is it possible to design a baiting regime that will suppress cat and fox numbers sufficiently to allow reintroduced mammals to survive? Since 2006, we have worked with the WA Department of Conservation and the Invasive Animals Cooperative Research Centre to trial a program of integrated feral predator control over the property. Foxes and feral cats were targeted with an aerial baiting program that deployed about 70,000 'Eradicat' sausage baits each year. This control program was matched with extensive and regular track monitoring for feral predators, and annual trapping surveys for native fauna.



Banded Hare-wallaby



Feral predator monitoring at Mt Gibson

W. Lawler



Western Barred Bandicoot

T. Fleming



The feral-proof fence at Scotia will be the basis for our Mt Gibson fence design

W. Lawler

The track surveys indicated that fox and cat numbers were suppressed as a result of this baiting, at least for part of the year. However, the suppression was more muted than hoped, and the feral predator populations recovered in the months following the baiting. This was reflected in the results of native fauna surveys, which failed to reveal a convincing recovery of mammals and reptiles. While broad-scale baiting may in future play a role in the protection of fauna at Mt Gibson, it will not offer the level of protection that we require for newly reintroduced mammals that are highly vulnerable to cats and foxes – **in other words, a reintroduction program is not possible unless a highly secure feral predator-free fenced area is established at Mt Gibson.**

The creation of a large feral-free area, surrounded by a specially designed fence, has been implemented successfully by AWC at places like Scotia and Karakamia where we are delivering effective conservation for species like the Bridled Nailtail Wallaby and the Boodie. **Subject to raising the necessary funds, AWC is now committed to building a feral-proof fence at Mt Gibson, establishing a large cat and fox-free area into which threatened mammals can be reintroduced.**

Is the project just about mammals?

Although the focus of the Mt Gibson project is the restoration of regionally extinct mammals, many other animal species will benefit from the removal of feral predators. At the community level, the loss of an entire suite of mammals has had untold repercussions on the structure and function of the ecosystem. Some of these repercussions are being explored at Scotia, in a research program led by David Eldridge (UNSW) and funded by AWC and a Linkage grant from the Australian Research Council. Many of the regionally extinct mammals are expert and committed diggers, turning over tonnes of soil every year. The research is showing that this soil turnover enhances the cycling of nutrients through the system, slows water run-off rates, increases seed germination rates and changes the bacterial balance of the soil. In other words, restoring the mammal fauna at Mt Gibson will have ecosystem benefits beyond species protection.

The fenced area at Mt Gibson will be one part of a holistic approach to improving the ecological health of the sanctuary. The conservation programs will continue to involve broad-scale feral animal control, as well as improved fire management. We have also begun a series of translocations of threatened flora, targeting species with very restricted distributions that are at risk from disturbance elsewhere in the region.

How can you help?

It will cost around \$2 million to establish the Mt Gibson feral predator-free area, remove the feral predators and herbivores from within the fenced area and reintroduce the initial suite of native mammals. We need your help to raise these funds so that Mt Gibson can become AWC's next feral predator-free haven for endangered mammals.

The Bilby Challenge (see page 3) has been established to help raise the funds required for projects like Mt Gibson. Your donation to AWC will be matched (50%) under the Bilby Challenge.

Mt Gibson is a biodiversity reconstruction project of national and international significance. Please help AWC turn back the tide of extinction and provide a more secure future for species like the Numbat, the Woylie and the Banded Hare-wallaby at Mt Gibson.

Scientific research: enhancing conservation

AWC's science program has three core elements:

1. **Strategic advice:** in particular, providing scientific advice on potential projects (such as acquisitions or reintroduction projects) and the extent to which they contribute to our mission.
2. **Ecological health monitoring:** measuring the ecological health of our properties and providing feedback on the effectiveness of land management strategies (adaptive management).
3. **Research projects:** we conduct, alone and in collaboration with other organisations, a suite of research projects designed to address key questions which are relevant to our ability to maintain the ecological health of our sanctuaries, including by protecting threatened species.



Mornington: Why do wildfires cause some species to decline?

This research examined the impact of different types of fires on the behaviour, breeding and survival of Red-backed Fairy-wrens. Low intensity prescribed fires had minimal effect, but wildfires resulted in reduced breeding success for this bird. Murphy S, Legge S, Heathcote J, Mulder E (2010). The effects of early and late season fires on mortality, dispersal, physiology and breeding of red-backed fairy-wrens, *Malurus melanocephalus*. *Wildlife Research* 37: 145-155.



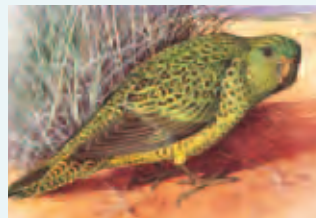
Faure Island: Reconstructing a faunal history

AWC, DEC, and the Museums of WA and SA carried out a multi-partner survey of the sub-fossil and extant flora and fauna of Faure Island. The results guided the design of the feral animal eradication and native fauna reintroduction programs that have since made Faure the home for a suite of threatened mammals. Richards J, Wilson (eds) (2008). *Faure Island Biological Survey*. Records of the WA Museum Supplement, Number 75.



Buckaringa: Conservation of nationally threatened Yellow-footed Rock-wallabies

This research uses GPS technology to understand how the ranging behaviour of Yellow-footed Rock-wallabies is affected by feral animal control programs. The results suggest that controlling goats has a larger positive impact on the Rock-wallabies than controlling foxes. Hayward M, et al. (in review) Spatial and activity patterns of yellow-footed rock-wallabies *Petrogale xanthopus* in Buckaringa Sanctuary, central Flinders Ranges, South Australia. *Wildlife Research*.



Newhaven: Finding the Night Parrot

With CSIRO and DEC, we collated all reliable historical Night Parrot records and overlaid them with topography and rainfall to find the combination of environmental factors that best predicts a Night Parrot sighting. This research will optimise future survey effort for this elusive bird.



Karakamia: Woylie decline

Woylies have crashed across WA, except for Karakamia, which protects the only WA population not in precipitous decline. AWC works with DEC and Murdoch Uni to investigate the role of disease and food limitation in contributing to this decline. Smith A, et al. (2008) Trypanosomes in a declining species of threatened Australian marsupial, the brush-tailed bettong *Bettongia penicillata* (Marsupialia: Potoroidae). *Parasitology* 135, 1329-1335.



- ▲ Newhaven is a joint project with Birds Australia
- Piccaninny Plains is a joint project with TLLF-WildlifeLink
- ◆ North Head is a collaboration with the Sydney Harbour Federation Trust

Scotia: The role of reintroduced mammals in ecosystem dynamics

The medium-sized mammals that have disappeared from most of the Australian mainland probably played a key role in cycling nutrient through ecosystems because they were prodigious diggers; an individual animal is capable of shifting several tonnes of soil each year. This research aims to understand the impact of this group of animals (and their loss) on ecosystem function. The work takes place at Scotia, where several of these native mammal species have been reintroduced. The study is showing that reintroduced mammals turn over much more soil (and therefore substantially increase the rate of nutrient breakdown) than introduced rabbits. The work is also describing how mammal activity affects bacterial communities and seed germination patterns. The research is a multi-partnered project, funded by the Australian Research Council and AWC.

and land management

The research projects being conducted across the AWC estate range from large projects covering an integrated set of issues across several properties to smaller and more focused projects carried out on one property. Some projects are carried out exclusively by AWC's team of field ecologists, while other projects are primarily carried out by external partners.

The geographic, taxonomic and thematic breadth of our research project portfolio is illustrated by the selected examples highlighted in this article. It is not an exhaustive list, and it focuses on property specific projects rather than the broad multi-site research projects such as our Australian Research Council-funded Northern Mammal Recovery Program (see pages 4-9).



Piccaninny Plains: Can we use Dingoes to limit the impact of feral cats?

This research examines the potential control of feral cats by Dingoes, and the consequences for the abundance of their prey. Leila Brook (James Cook University) has been conducting sand-trap and camera trap surveys of Dingoes and cats on Piccaninny Plains, Mt Zero-Taravale and Brooklyn sanctuaries. The study compares densities of these predators in habitats with different structural complexity, and properties with different management regimes.



Brooklyn: Small mammals and altitudinal gradients

This research showed that mammal species richness was lowest in woodlands that had less structural complexity, and highest in areas with the greatest density of different vegetation types (ie. at higher altitudes). See Bateman B, et al. (2010) Small-mammal species richness and abundance along a tropical altitudinal gradient: an Australian example. *Journal of Tropical Ecology* 26: 139-149.



Mt Zero-Taravale: Conservation of Northern Bettongs

This research (with James Cook University) is identifying the factors limiting the current distribution of the Northern Bettong, and building models to predict its response to climate change. Intensive surveys for the Bettong and its food resources (truffles and Cockatoo Grass) were coupled with experiments of the response of food resources to fire and habitat change. See Bateman B (2006-2010) *Conservation of the northern bettong—limits to current distribution, and a mechanistic model for predicting effects of climate change*. PhD Thesis, JCU.



North Head: Restoring the native fauna of Sydney's coastal bushland

Small native mammals have been replaced by invasive black rats in Sydney's coastal bushland. This research will investigate ways of reintroducing native rodents after intensive pest control in a way that tips the competitive balance in favour of the natives. It represents a novel approach to feral animal control with wide application. It is primarily funded by the Australian Research Council (research partners are UNSW, Uni of Sydney, DECCW, Landcare Research NZ, Rentokil, Taronga Zoo, Mosman Council, Sydney Harbour Trust).



Curramore: The effect of lantana removal on reptiles in the SE Qld tall forests

This study (AWC and Griffith Uni) examined the impact on reptile communities from different lantana control methods. Sun Skinks *Lampropholis* were more common at sites where lantana was controlled; the skink *Eulamprus murrayi* (which is associated with closed canopy forests) was largely absent from these sites. See Virkki DA (2009) *Lantana management and its impacts on reptile assemblages and habitat quality within a wet-sclerophyll forest in south-east Queensland*. BSc (Hons) thesis, Griffith Uni.



Inventory surveys and ecological health monitoring

Each year, AWC ecologists, students, interns and volunteers carry out a prodigious biological survey effort across the sanctuaries, using a variety of different techniques. The surveys are carefully designed to fulfil a number of inter-related purposes, particularly:

- informing species and ecosystem inventories;
- contributing towards an assessment of the ecological health of each sanctuary (which also provides feedback on the effectiveness of our management strategies); and
- addressing research questions as part of carefully designed experiments.

The Summer 09/10 edition of *Wildlife Matters* summarised AWC's survey effort during 2009, as well as our approach to measuring ecological health. In this edition, we present an update on the biological inventory and monitoring program during the first few months of 2010.

Species inventories

As the cumulative survey effort grows, and our species lists become more comprehensive, it theoretically gets harder to add new species records to a sanctuary's inventory. Despite this, it's a rare survey that fails to throw up something new. For example, at Newhaven, on the edge of the Tanami and Great Sandy Deserts, we catch over 1,200 reptiles each year over the course of the 4 week survey. With such large hauls over several years, one would expect to have the inventory covered off! But the 2010 survey still added two new reptile species – a Painted Dragon and the Central Desert Robust Slider. The identity of a third species, an unusual skink, is yet to be confirmed. Higher-than-average rainfall during 2010 generated the greatest novelty of the survey – frogs (over 300 of them) including two new species records: Spencer's Burrowing Frog and the Tanami Toadlet. This Toadlet is so poorly known that its call has never been described. Its discovery on Newhaven represents a significant range extension for the species.

A similar example comes from Brooklyn in north Queensland, one of the most biodiverse properties in the country, and the site of numerous previous surveys and research.

The most recent fauna trapping survey in April was a joint project conducted by CSIRO and AWC, as part of a multi-year collaborative effort: it added several species to the already-impressive sanctuary inventory.

Scotia, in the mallee of western NSW, is another sanctuary that has enjoyed substantial survey effort over the past few years, yet a suite of bird surveys at permanent sites produced several records of rare or unusual species including Southern Scrub-robins, Striated Grasswrens, Red-browed Pardalotes, Square-tailed Kites, and most significantly – Scarlet-chested Parrots. This species has only been seen in NSW on one other occasion since the 1950s.

A recent biodiversity survey at Buckaringa, in the central Flinders Ranges, recorded 117 species of native vertebrates and 150 plant species, including 12 threatened species. Confirmations of the Inland Cave Bat and the Gibber Gecko were highlights, being substantial range extensions. This was Buckaringa's first general fauna survey; as well as informing the species inventory, this survey was the first step in designing a comprehensive ecological health monitoring plan for the sanctuary.

Ecological health monitoring

The indicators of ecological health for each sanctuary are grouped into three themes: we measure the extent or severity of threats, the status of key species and the status of key ecological functions. Examples of some of the information collected against these themes from various sanctuaries during the first part of 2010 are given below.

Threats

In March this year, the rangers from the Nyirripi community helped AWC staff with the annual sand plot surveys at Newhaven. The sand on one hundred 2 hectare plots was carefully checked for the tracks of a range of feral species (as well as native animals). Key results from this survey were that foxes remain rare on Newhaven, the Dingo population is stable, and feral cat numbers are slightly lower than last year.



Central Desert Robust Slider, Newhaven

R. Lloyd



Black-flanked Rock-wallaby monitoring at Paruna Wildlife Sanctuary

W. Lawler

Species

For each sanctuary, we select a set of indicator species that collectively act as a surrogate for all the biodiversity on the sanctuary, including some indicators for our reintroduced mammal populations and other target species.

Before its acquisition by AWC, the mammal fauna of **Faure Island**, in Shark Bay, had been decimated by the impacts of introduced herbivores and feral cats. Following an intensive feral animal control program, five threatened mammal species have been reintroduced to the 5,000 ha island as part of an ongoing biodiversity restoration program. The status of these populations is measured biannually; this provides an indication of the overall ecological health of Faure. The most recent survey in March showed that populations of Boodies and Western Barred Bandicoots continue to increase, and Shark Bay Mice are fluctuating seasonally around a stable mean (see graph).

Monitoring information has also been collected for many indicator species on other sanctuaries during the first part of 2010 including:

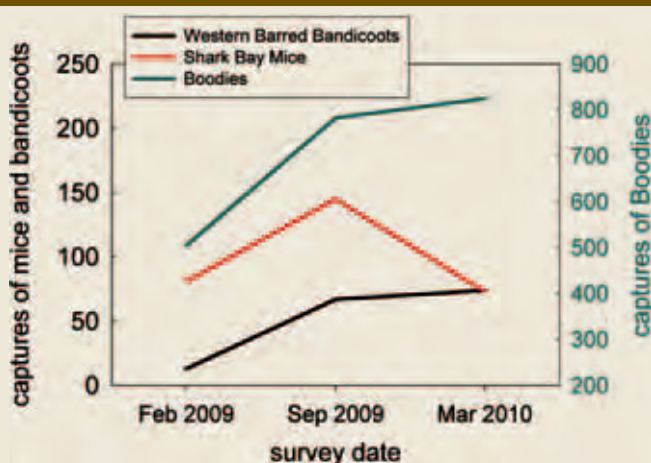
- A census of an important colony of nationally threatened **Yellow-footed Rock-wallabies** at Buckaringa recorded higher numbers (67) of this stunning animal than expected.
- Focal surveys for **Crest-tailed Mulgara** at Kalamurina have confirmed continued occupancy at almost 90% of the previously occupied burrows.
- Twenty volunteers from the **Malleefowl** Preservation Group carried out a two week mound survey at Mt Gibson; the group walked a total of 996 km of transects during the survey, recording a total of 88 malleefowl nests.

Ecological function

Indicators of ecological function relate mainly to the availability and cycling of nutrients and water in the environment, community structure and stability, and disturbance processes like fire.

- Project Numbat volunteers worked with AWC staff to carry out termite surveys on Mt Gibson, in the northern wheatbelt of WA. These surveys provide information on habitat productivity and also the suitability of Mt Gibson for a reintroduction of the nationally endangered Numbat, which is a termite-specialist.
- The reintroduced mammals at Scotia are exceptional diggers, shifting tonnes of soil every year. Their industrious tilling leaves behind small pits in the soil surface that reduce water and nutrient run-off rates (thus enhancing productivity). As part of our ecological health monitoring program, we have been estimating the density of pits in different parts of Scotia, so that we can compare the soil health of feral-free areas (where there are lots of small digging mammals) with areas outside the feral-proof fence (where there are no Bilbies, Boodies and other vigorous diggers). This work is carried out as part of a broader research project in conjunction with the University of NSW.

Faure Island: reintroduced mammal survey results



Tanami Toadlet

R. Lloyd

Fire management

Fire is one of the most critical on-ground management priorities on many AWC sanctuaries. The last issue of *Wildlife Matters* outlined AWC's approach to managing fire in a way that produces effective and measurable conservation outcomes across properties with a diverse range of ecosystems. In this issue, we provide an update on some of the fire management activities that have taken place in the first half of 2010.

Northern properties

When it comes to managing fire, the first half of the year is "show time" for staff at AWC's northern sanctuaries. The wet season ends around April, and much of the prescribed burning program takes place in the two months immediately after the rains stop, when fires are relatively less intense, cover smaller areas, and are easily extinguished by a cool night, morning dew, or even a drop in the breeze.

However, considerable preparation precedes the strike of the first match, or the launch of the first aerial incendiary. Step one takes place during January and February: AWC science staff used satellite imagery to carry out analyses of the spatial fire patterns from the previous year for all eight northern sanctuaries, and also for the EcoFire project area (EcoFire is familiar to regular readers of *Wildlife Matters* – it is the regional fire management program covering 5 million hectares in the Kimberley).

This analysis is important for two reasons:

- First, to review our performance against management targets. For example, one of the performance targets for EcoFire is to shift the seasonality of fires from the second half of each year (when fires are extremely large and intense) towards the first half. We measure this by calculating what proportion of all burnt areas within the project area were created between January-June, as opposed to July-December. EcoFire has dramatically achieved this performance target, shifting the percentage of early fires from less than 10% (before the project began) to 40% in 2009.

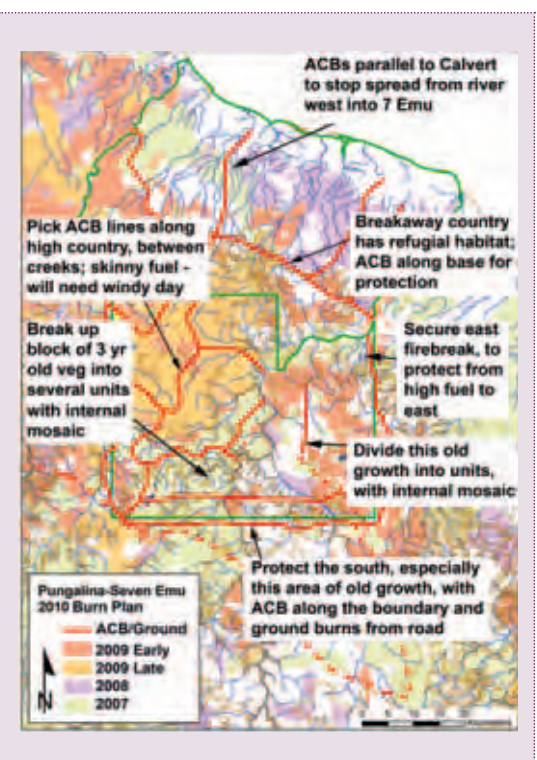
- Secondly, to help us plan the prescribed burning program for the current year. Burn planning is a highly iterative process, and the plan depends greatly on which areas burnt in previous years, especially the preceding two years. A simple example is that on some properties, country that burnt in 2009 will not carry a fire in 2010 – it's therefore pointless to prescribe a fire through these freshly burnt areas.

Step two takes place during March and early April: armed with up-to-date maps of the fire histories of the properties and surrounding areas, AWC staff liaise with a wide range of neighbours and regional groups to discuss the development of the burn plans. This step is critical because burn plans are often adjusted based on what neighbours intend to do on their properties, and the cross-boundary coordination that results from dialogue leads to better regional fire management outcomes.



Sammy Walker and AWC reduce fuel around a sacred site

R. Kingswood





A team from the Tirralintji-Yulumbu communities carry out prescribed burning operations on Mornington Sanctuary

R. Kingswood

The EcoFire project involves a particularly extensive series of planning meetings, because it includes so many diverse stakeholders, including several groups of traditional owners, pastoralists, and government agencies, all of whom are spread over large distances in the Kimberley.

AWC staff met with leaders of the Garawa Ranger group and Northern Land Council representatives in Katherine to develop a burn plan for Pungalina. The prescribed burns will be carried out by the rangers and AWC staff in June. Because of the inherent uncertainty about fuel loads on the ground, and weather conditions on the day, burn plans are designed to be maps of intent rather than letters of law. This is demonstrated by the map (on page 18) summarising the burn plan for Pungalina – it outlines the results that we seek, but then leaves AWC fire managers and the Garawa Rangers to make the decision on the ground about how best to achieve that.

As this newsletter goes to press, burn plans across AWC's northern sanctuaries are at different stages of execution. In the Kimberley, the burning began early thanks to a failed wet and is almost over. The extensive aerial ignition program was once

again complemented by ground-based burning carried out with property owners and managers. A team from the Tirralintji and Yulumbu Aboriginal communities worked with AWC staff on Mornington and Marion Downs for about four weeks, carrying out burning and also participating in the biodiversity monitoring that accompanies the fire program. Further east, huge wet seasons courtesy of two cyclones have delayed the start of burning on Wongalara and Pungalina-Seven Emu. The Queensland properties are more or less on track with their 'usual' schedules, despite a dry spell in the middle of the last wet season.

South of the tropics

Although the intervals between fires can be much longer south of the tropics, fire management still has an annual rhythm, because prescribed fires still have a season. At Newhaven, burn plans are developed by April each year, and burning is carried out over the winter months (May-August), when plummeting night time temperatures help to control the prescribed fires. The burn plan for 2010 includes, for the first time, a substantial aerial ignition component. Newhaven enjoyed well above average rain in the first few months of 2010, creating an explosion of grass growth. As this grass cures, it becomes fuel that Newhaven's managers can use to good effect to create strategic burns on a much larger scale than has been possible to date.

At Scotia, AWC staff have been carrying out a series of prescribed burns, some of which have had asset protection as the main focus. The word 'asset' usually conjures up images of houses and suburbs. At Scotia, asset refers to the seven highly threatened mammal species that have been reintroduced into the largest feral-free area (8,000 ha) on the Australian mainland.

Part of Scotia's fire management is directed towards removing fuel next to the feral-proof fences (in order to protect the integrity of the fence), and also introducing fire into the landscape that includes the fenced areas in order to create a range of vegetation ages. This reduces the risk that the fenced areas could be burnt in a devastating wildfire, and improves habitat quality.



A prescribed burn at Scotia

J. Stephens

Can man's best friend reduce the impact of cats?



Sally, our cat detection dog, in training

Freeswimmers

Based on preliminary research we have carried out at Mornington Wildlife Sanctuary in the Kimberley, including radio-tracking cats and an analysis of stomach contents, we estimate that ***feral cats across northern Australia are killing and eating over two million native animals every day.*** In a bid to improve our understanding of feral cat behaviour and design strategies to reduce their impact, AWC is trialing a new weapon in the battle against feral cats...a Springer Spaniel!

There is currently no effective strategy for eliminating or suppressing cat populations across entire landscapes in northern Australia. Cats are cautious, which means they rarely enter traps (even with enticements of a variety of visual, auditory and olfactory lures).

Baiting is not an option because cats do not readily take baits and, in northern Australia, there remains a high risk that non-target native species (Quolls, Goannas, Dingoes etc) will instead take the baits.

In order to identify more effective control strategies, we desperately need detailed information on the ecology, behaviour and impact of feral cats. However, standard monitoring methods are ineffective because they are 'passive' in nature – they require the cat to approach the sampling tool (which they generally will not do given their cautious nature). It is clear we need an 'active' sampling method and we think the solution may have been 'under our noses' for some time: the dog and, more specifically, a Springer Spaniel!

Springer Spaniels are equipped with a tool (an astonishing sense of smell) that makes an invisible animal like the feral cat highly detectable. With this in mind, AWC has been working with Steve Austin, a highly regarded animal trainer, to source and train a Springer Spaniel as a 'cat detection dog': a dog that will pick up the scent of a cat and follow its trail, leading the researcher to the cat, instead of waiting (often without success) for the cat to visit a sand-plot or a trap. After testing several puppies, Steve found a dog that he believes has the right combination of talent, drive and intelligence to join AWC as our new weapon against feral cats. Sally is now more than 12 months old and has been at Mornington since February completing her training.

Over the past four months, AWC staff have been steadily developing Sally's tracking skills and building up her physical endurance. A key training exercise involves Sally following the scent of a cat skin that has previously been dragged for some distance through the scrub; Sally can now follow a drag (twisting and turning over rocks and through creeks) that is over 1 km long, and up to 24 hours old, with complete confidence. By detecting cats in the landscape that we could not otherwise find, Sally will play a vital role in helping unlock some critical information about how cats use the landscape, and in particular, whether fires and introduced herbivores make it easier for cats to hunt native animals. Sally will also help us find and remove feral cats from feral-free enclosures that we intend to build at Wongalara. Her cat detection skills could give us a vital edge in the battle against feral cats.

Pests of the desert

Regional camel control at Kalamurina

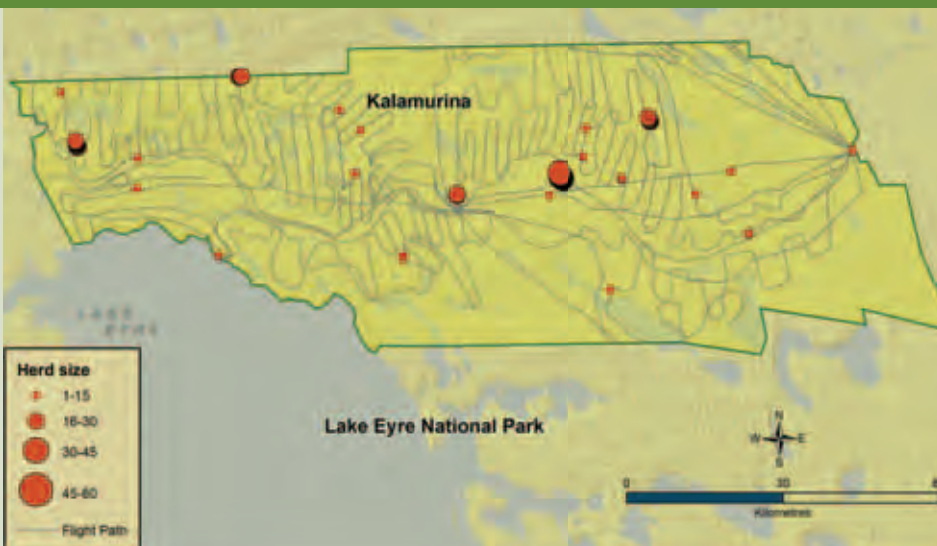
Most Australians never see camels, although there are one million of these introduced pests covering over a third of the continent. They are so well adapted to the deserts of central Australia that their population doubles every 8-9 years. Although camels are native to Arabia, the first camels to Australia were actually imported from the Canary Islands around 1840, while most of the 15,000 or so camels that were brought here in the following decades came from domestic herds in India.

Camels were brought to Australia for exploration and for hauling freight across inland Australia. Some inevitably became feral - for example, a few camels on the 1860 Burke and Wills expedition decided they would try their luck with the unfamiliar Australian deserts rather than stick with their human companions. During the early 20th Century, when motor vehicles began replacing camels, domesticated camels were turned loose in droves and the feral herd began to increase substantially.



Feral camels north of Kalamurina

Camel control at Kalamurina



Camels have significant impacts on desert ecosystems. They are browsers, able to chew most desert plant species to the point where mature shrubs and small trees are severely defoliated, and young plants are killed. This change in the structure of vegetation has many flow-on effects, most obviously by removing cover and habitat for smaller animals. Their heavy feet accelerate erosion of the fragile desert soils, and their trampling is especially destructive at water sources. When camels reach densities of two per square kilometre, their impacts on soil and vegetation are clearly visible. These densities are now being exceeded in many parts of central Australia.

AWC has implemented camel control programs at both Newhaven and Kalamurina Sanctuaries – in 2009 alone we removed over 600 animals from these two properties. However, camels have a legendary ability to move very long distances without water. To limit the extent of reinvasion, we are also active participants in regional control initiatives, particularly at Kalamurina. Control of feral herbivores is particularly important this year, following the first significant rains at Kalamurina since AWC purchased the property and removed cattle.

As part of our commitment to regional collaboration, AWC has partnered with other government and non-government agencies in a multi-state initiative to bring the density of camels in central Australia to less than 1 animal per 5 square kilometres. In one of the earliest steps of this initiative, a team from the South Australian government (funded through the NRM Board and by the Federal Government's Caring for Our Country Program) was based at Kalamurina for a week in mid May. The team worked closely with AWC sanctuary staff and carried out aerial control operations across Kalamurina, adjacent pastoral properties and the Simpson Desert conservation parks. Over five days, and in accordance with a strict code of practice, over 170 camels were removed from Kalamurina, with many more removed from adjacent protected areas.

This is a significant step in safeguarding the ecological health of Kalamurina and, in particular, promoting the restoration of its floodplain habitats.

Sanctuary updates

During the first three months of this year **Newhaven** received over 450 mm of rain, making 2010 one of the wettest years in recent decades. Burrowing frogs, termite alates and shield shrimps abounded. Spinifex had a massive seeding event, annual grasses (some of which had never been seen on Newhaven before) proliferated, samphires germinated around the edges of the salt lakes, and lignum flourished. AWC's ongoing feral animal control means that this new growth will be much less impacted by camels than has happened in the past. Representatives from Birds Australia, our partners at Newhaven, visited in March during the height of the survey period. The annual bird survey, led by Richard Jordan, recorded 127 species at 70 permanent sites, including a handful of new additions like Little Curlew and Marsh Sandpiper.

Wongalara experienced massive floods thanks to Cyclone Paul; since April, Chris Whatley has been repairing the damage to roads and fences, and generally cleaning up the deposited silt, with the help of family, neighbours and volunteers. Earlier in the wet season, a dry spell (ironically!) allowed an opportunity to carry out weed control, targeting especially Grader Grass which is limited to a few patches. Wongalara is one of the few properties in the region that is largely free of invasive grass species, but continued vigilance is required to maintain that status.

Pungalina-Seven Emu was even more seriously affected by flooding this wet, including bearing the brunt of two cyclones (Olga and Paul). During the worst flood, Rod and Beth Beament evacuated the homestead in their tinny and motored to the other end of the airstrip to reach dry ground. The total rainfall for the wet was 1763 mm (the average is about 950 mm). As the country slowly dries out, AWC staff and the Garawa Rangers are preparing for another season of prescribed burning and our next fauna survey. One of the survey aims is to resolve the identification of a mystery freshwater turtle that was found last year – it is either a new species or a variation of the endangered Gulf Snapping Turtle.

AWC staff and the Board of TLLF-WildlifeLink (the Tony and Lisette Lewis Foundation, our partners and joint title holders) met at **Piccaninny Plains** in April. The prescribed burning program will begin this month, in accordance with a detailed plan developed by AWC ecologists and land managers. Preparations for the next flora and fauna survey are well underway – the focus will be on monitoring the impacts of grazing on native plants and animals.

Rigel Jensen and Peter Stanton have finished a prodigious volume of fieldwork to prepare the **Brooklyn** vegetation map; the data is currently being digitised. In April, an AWC/CSIRO team resurveyed 40 permanent monitoring sites that were first established in 2006. The survey found Northern Quolls and Canefield Rats in woodlands away from the rocky foothills of Mt Lewis, for the first time. This is significant because it may signal a recovery of fauna away from the refugial areas of higher rainfall and complex topography.



*Varied Lorikeet, Mornington
Wildlife Sanctuary*

S. Murphy





Coastal Floodplains, Seven Emu

W. Lawler

At **Mt Zero-Taravale**, preparations are underway for a major fauna inventory survey in September. The pilot wet sclerophyll restoration project, which involves hand clearing of invasive rainforest species plus follow-up burns, is being expanded. This project is restoring critical habitat for the endangered Northern Bettong.

In the first of a series of translocations planned for the species, seven Numbats were reintroduced into the second 4,000 ha fenced area at **Scotia**, joining the Woylies, Bilbies and Bridled Nailtail Wallabies that are already thriving there. Other science-related activity has included bird surveys, flora inventory, vegetation mapping, and the start of a new PhD project (on Woylies). The feral animal control program continues to reduce the fox populations in the (unfenced) south of the sanctuary using new, experimental poison-delivery technology. Joe Stephens (sanctuary manager) and his team have carried out a series of successful prescribed burns. Finally, the many dams on Scotia are a legacy of the pastoral era; but widely-distributed permanent water can destabilise native fauna communities, and allow feral animals like goats to have greater reach across the landscape. With funding support from the Lower Murray Darling Catchment Management Authority, 20 such dams are earmarked for closure, and other dams will be fenced off.

Kalamurina, on the northern shore of Lake Eyre, has received floodwaters for the second year running, with massive rains in Queensland flowing down the Warburton River. Good rains (196 mm; the annual average is 140 mm) have also fallen on Kalamurina itself, stimulating a pulse of vegetation growth across the entire property. Since cattle have been removed, and camels are being actively controlled, this regeneration will occur in the near-absence of introduced herbivores for the first time in decades.

Buckaringa hosted an Open Day over the ANZAC Day long weekend, giving neighbours and other members of the public a chance to see the results of our feral animal and weed control programs first-hand. A survey of Yellow-footed Rock-wallabies in early May revealed a minimum of 67 individuals on the sanctuary. The most recent round of track surveys at **Yookamurra** showed that Numbats are widely distributed across the sanctuary. Plans are well-underway for the first extensive bird survey at **Dakalanta**, scheduled for June/July.

Six new Honours students have started work at **Karakamia** and **Paruna**, on a range of projects from novel approaches to estimating Western Ringtails populations, to a population genetic study of Black-flanked Rock-wallabies. Tamar Wallabies and Rock-wallabies at Paruna are usually monitored with spotlight surveys, but in March the populations were trapped to get more detailed information on condition and demography. This survey confirmed a large proportion of recruits for both species; in other words, the reintroduced animals are breeding successfully.

The most recent biannual fauna survey on **Faure Island** took place in March. As well as monitoring the reintroduced species, the team trialed a variety of techniques for estimating goanna densities, because populations of native predators like goannas may change as numbers of mammals increase.



Tamar Wallaby, Karakamia

W. Lawler

Community celebrates Bowra acquisition



Previous owner Ian McLaren discusses the importance of Bowra with the Federal Environment Minister, Peter Garrett

National Reserve System



AWC Chairman Martin Copley

National Reserve System



AWC Ecologist Steve Murphy

National Reserve System

Federal Environment Minister, the Hon Peter Garrett MP, travelled to Bowra in late May to preside over celebrations marking the acquisition of AWC's 21st sanctuary and its addition to the National Reserve System. It was the culmination of a remarkable community effort to protect one of Australia's most important bird habitats.

Located in the heart of the Mulga Lands in southern Queensland, Bowra is a birdwatcher's paradise. It is home to more than 200 species of birds including iconic species such as Hall's Babbler, Chestnut-breasted Quail-thrush, Bourke's Parrot and the Chirruping Wedgebill. Many birders travel long distances to Bowra to see special birds like the Grey Falcon, which breeds here, and the Black Falcon, which is also commonly seen. Fourteen species of parrots and 18 species of raptor highlight the significance of Bowra as a hotspot for Australia's inland birds.

The importance of Bowra has long been recognised by the members of Birds Queensland, Birds Australia and BOCA (Bird Observation and Conservation Australia), who have visited the property regularly over the years. During this time, pastoralist Ian McLaren managed Bowra with care, balancing a conservative stocking rate with practical land management. The property had been in the McLaren family for five generations; so when Ian made the difficult decision to sell, birdwatchers from around Australia were anxious to ensure that Bowra went to a good home.

When approached by representatives of bird conservation organisations, Australian Wildlife Conservancy (AWC) quickly recognised the importance of securing Bowra for conservation. It contained a number of mammals, birds, reptiles and amphibians that are not protected on any other AWC sanctuaries, and a large number of threatened and declining species. However, our ability to purchase Bowra was contingent on the Federal Government providing financial support under their flagship National Reserve System (NRS) program.

Under the NRS program, the Federal Government provides financial support for the acquisition of ecologically significant properties on the condition that they are managed in perpetuity for conservation. Bowra fitted the program criteria perfectly. It is located in one of Australia's highest priority bioregions, is home to a diversity of threatened species

and contains a suite of ecosystems that are not found in any other protected area. With a grant of nearly \$1.1 million from the Federal Government (about 66% of the purchase price), AWC was able to sign a contract to acquire Bowra.

At that stage, we still needed another \$1 million to complete the acquisition and provide for its management. A generous AWC donor pledged to match all gifts for Bowra until we met our target. Our partners (Birds Queensland, Birds Australia and BOCA) threw their support behind the fundraising campaign, mailing their members, raising awareness and promoting the Bowra campaign. The response from AWC supporters and our partners has been very strong and, at the time of going to print, nearly \$930,000 has been raised (so donations are still being matched!)

Our success in finalising the acquisition of Bowra has therefore been built on a strong private-public partnership: financial support from the Federal Government has been matched by donations from individuals around Australia. It highlights how funding under the National Reserve System program can help organisations like AWC mobilise philanthropic support, which will be increasingly important in protecting Australia's threatened wildlife at places like Bowra.

To celebrate the acquisition of Bowra, the Australian Minister for the Environment, Peter Garrett, travelled to Bowra for a special event on 21 May. It was a celebration not just of the property's outstanding conservation values but also of the tremendous community effort that has enabled AWC to purchase the property.

Kicked off by a welcome from traditional owner, Wendy McKellar, the Bowra celebration was held on the banks of Gum Holes Creek, a tributary of the Warrego River. The Mayor of Paroo Shire, Jo Sheppard, as well as the President of Birds Queensland (Mike West) and the Chief Executive of Birds Australia (Graeme Hamilton) were all present. The local SES crew provided a boat and crew so that Martin Copley (AWC Chair) and Steve Murphy (AWC ecologist) could show Peter Garrett the stunning birdlife on Gum Holes Creek, still high from the recent floods in south-west Queensland.

“Our family has cared for this spot for generations, and we’ve always known it was something special. Deciding to sell was hard, but offering it to the Australian Wildlife Conservancy felt like the right way to go”

Ian McLaren, previous owner of Bowra

The years of careful stewardship and land management by Ian and Julie McLaren, which has helped maintain the quality and diversity of habitat on Bowra, was applauded by all. As part of the transition to AWC, Ian and Julie are continuing to assist with land management at Bowra. Collaboration with our pastoral neighbours, who were part of the celebration, will also be a feature of AWC’s efforts to address issues like weed and feral animal control into the future. More broadly, Bowra will have an important ongoing role in the local community, hosting visitors from across Australia and overseas as well as being a base for research and education (students from Cunnamulla State School attended the event and were given an introduction to biological survey techniques by AWC ecologist, Manda Page). After five generations in the McLaren family, Bowra has a new owner: but in managing the property we are determined to retain and build on the knowledge and experience of the McLarens, the local community and the birders who helped put the spotlight on this remarkable property. *Thank you to the Australian Government for its support under the National Reserve System and to everyone who contributed to the Bowra campaign.*

Seek and Tweet: the Bowra Challenge

As part of our efforts to raise awareness about Bowra and conservation, a special challenge was launched via social networking site Twitter in the week prior to the Bowra event. A donor pledged \$10,000 if we could secure 1,000 people to “follow” AWC ecologist Steve Murphy on Twitter as he attempted to see 100 bird species on Bowra in the 24 hours prior to the visit by Peter Garrett. Steve succeeded in seeing 102 bird species in less than a day and his efforts were followed by more than 1,800 people around Australia and overseas. Watch out for more AWC action on Twitter.



Grey Falcon

D.Portelli



Major Mitchell's Cockatoo

D.Portelli



AWC Regional Ecologist, Manda Page, with students from Cunnamulla state school

National Reserve System



President of Birds Queensland, Mike West

National Reserve System

AWC and Optus

Saving Australia's threatened wildlife



Antilopine Wallaroos are declining in many parts of northern Australia

S. Murphy

Optus has further strengthened its ground-breaking commitment to the conservation of Australia's threatened wildlife by moving to extend its partnership with AWC in 2010. This is great news for a host of threatened species such as the Purple-crowned Fairy-wren and the Yellow-footed Rock-wallaby – just two of the species that have already benefited from the support of Optus!

From mid 2010, the focus of support under the Optus partnership will be:

- securing Pungalina-Seven Emu Wildlife Sanctuary as a vital stronghold for the threatened wildlife of the Gulf of Carpentaria; and
- AWC's research into whether Dingoes suppress feral cat and fox populations, thus helping to protect Australia's threatened fauna.

These projects are especially relevant to our Northern Mammal Recovery Project (see pages 4-9) which aims to save the declining mammals of northern Australia from feral cats and herbivores as well as wildfire.

As a leader in the provision of integrated telecommunications services, Optus is also implementing a cutting edge communications strategy that will help to generate a new level of public awareness about the plight of Australia's threatened wildlife. Watch out for more information about this exciting initiative.

Our partnership with Optus is a great example of corporate support that makes a real difference. It is supporting practical action in the field to protect Australia's endangered animals as well as leveraging the experience and expertise of Optus in promoting community awareness about our unique wildlife.



Exterra: protecting 80,000 hectares and still counting...

Exterra is Australia's leading brand for environmentally friendly termite management in the urban market. Under the AWC-Exterra partnership, a portion of the proceeds from the sale of each Exterra termite intervention and baiting system is donated to AWC to support the conservation of land in northern Australia. After donating \$150,000 in the first year of our partnership, sales of Exterra termite systems have generated a remarkable \$86,000 so far in year 2 ... and we are only half-way through the second year of the partnership! Exterra's total contribution to date is the equivalent of funding the management and protection of 80,000 hectares of northern Australian habitat. AWC is grateful to Exterra and its motivated network of professional Pest Control Managers whose support is making a vital contribution toward the conservation of northern Australia's declining mammals and birds. Remember, your next investment in termite management could help save the Northern Quoll!

Tim Flannery

A new form of patriotism

Tim Flannery is a Director of Australian Wildlife Conservancy and the 2007 Australian of the Year. He is an internationally acclaimed scientist, explorer, conservationist and writer. His books include *The Future Eaters* and *The Weather Makers*, and he is recognised as one of our leading thinkers on environmental issues. In this article, Tim talks about his personal connection with AWC and our work. It is a summary of a speech that Tim gave in London earlier this year at an event hosted by Australia's High Commissioner to the United Kingdom.

I wanted to take this opportunity to let you know what AWC means to me, personally. I've been involved with the organisation since 1998. Quite apart from the species brought back from the brink of extinction, and the ecosystems restored, the thing I value most about my association is the way it's allowed me to express, in a very special way, my relationship with my country. Over the 230 years since Australia was colonised, all too often we've treated Australia as if it were not our home. I remember very well my parent's generation talking about Britain as 'home' – as if they were just squatting in this country, exploiting its resources and imagining that we had somewhere else to go to if its soils blew away, and its biodiversity was lost.

Through the activities of AWC I've learned that we can establish a very different kind of relationship with this land – one that permits us to nourish and sustain its biodiversity, its soils and landscapes. Visiting sanctuaries over the years I've seen the difference that AWC makes. When first acquired, some properties were degraded, with nature hanging on by a thread. On Faure Island in Shark Bay, for example, I remember centuries-old sandalwood trees that were dying because goats had nibbled away all but a dozen or so, unreachable leaves. The sand around was largely bare because of the goats and sheep, and cats had exterminated all of the native mammals. Visiting Faure today in spring, you'd never realise that the abundance of wildlife existing among the wildflowers simply had not been there a few years earlier.

Australia's indigenous biodiversity, and the ecosystems they make up, are what gives Australia its productivity and character. It's ecosystems that create our soils and

keep it in place. They also help capture rainfall in soils and plants. Those same ecosystems are also responsible for helping to feed and clothe us. We humans are part of that biodiversity – the only part moreover that can make informed decisions about how we relate to our country.

"It's us that decide whether native species will go extinct, or be allowed to thrive.

AWC, I believe, allows us to express a new sort of patriotism. Through it we can slowly reappraise what it means to be Australian."

If we want a long-term future for ourselves and our children, we need to learn about our country, and to nurture it – just as we hope that it will continue to support us. For all these reasons, AWC is vital to me because it allows me to express my love of my country.



Professor Tim Flannery releases a Banded Hare-wallaby on Faure Island



Tim Flannery speaking in New York about AWC's work

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: see page 3 for more information.



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I am interested in making a bequest in my will.
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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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