

wildlife matters

australian



wildlife
conservancy

Summer 2014/15

Martin Copley (1940 – 2014):
Saving Australia's wildlife



Saving Australia's threatened wildlife



Welcome to the Summer 2014/15 edition of *Wildlife Matters*.

This edition is our first *Wildlife Matters* since Martin Copley AM, our founder and Chairman for nearly 15 years, passed away earlier this year. Martin will be remembered as one of Australia's greatest conservationists and philanthropists. We pay tribute to Martin in the following pages, although it is impossible to adequately describe the extent of Martin's immense contribution to conservation.

In the early 1990's, Martin established Karakamia – AWC's first sanctuary – in the Perth Hills. Even then, Martin had a vision of a new, non-profit model for conservation – a model that could help lead the way in reversing Australia's extinction crisis. Among his many extraordinary achievements, perhaps Martin's greatest legacy – his greatest gift to the Woylies, Gouldian Finches and Bilbies – is his success over the last two decades in realising that vision.

Through the development of AWC, Martin oversaw the creation of an effective new model for conservation that all Australians could be a part of. With your support, AWC has now grown to 23 properties covering 3 million hectares across Australia. These properties protect 83% of Australia's terrestrial bird species and 67% of its terrestrial mammal species including some of the largest remaining populations of threatened species such as the Bilby, Sharman's Rock-wallaby and the Purple-crowned Fairy-wren.

It is little wonder that a special memorial service to celebrate Martin's life, held in Perth in November, attracted a video tribute from Sir David Attenborough, a personal message from HRH Prince Charles and other contributions from Federal and WA Ministers for the Environment as well as former Australian of the Year, Tim Flannery. A short video with highlights from the memorial service will soon be uploaded to our website.

All of us at AWC are determined to honour Martin by continuing to build on his remarkable legacy. In this edition of *Wildlife Matters*, you will read about our progress on several key projects:

- Our ground-breaking research on feral cats has led to major new discoveries which, in turn, are guiding our delivery of innovative land management strategies designed to reduce the impact of feral cats.
- At Mt Gibson, we have completed the construction of 43 kilometres of specially designed feral-proof fencing, a key step in establishing the largest fox and cat-free area on mainland Western Australia.
- At Pungalina, we are in the final stages of establishing the only large feral herbivore-free area in the Gulf of Carpentaria.

The key to our continued success has been our focus on the delivery of practical land management informed by the best available science. With around 80% of our staff based in the field, AWC is uniquely positioned to implement such a model. It is a model that provides new hope for Australia's threatened wildlife by enabling AWC to deliver strong ecological returns in a cost-effective manner.

Thank you for your ongoing support, which is greatly appreciated by all of us at AWC and is critical to our ongoing success in delivering effective conservation for Australia's wildlife.

Atticus Fleming
Chief Executive

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 23 sanctuaries covering over 3 million hectares (7.4 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.
- Over the last ten years, around 88% of AWC's total expenditure was incurred on conservation programs, including land acquisition, while only 12% was allocated to development (fundraising) and administration.

Australian Wildlife Conservancy

PO Box 8070
Subiaco East WA 6008
Ph: +61 8 9380 9633
www.australianwildlife.org

Cover image: The Brush-tailed Bettong (Woylie) is now critically endangered

Photo by W Lawler



Martin Copley AM, 1940-2014



Martin releasing a Western Brush Wallaby at Karakamia

On 30 July 2014, Australia lost one of its great conservationists and philanthropists when Martin Copley AM, AWC's Founder and Chairman for nearly 15 years, passed away.

From Woylies and Black-flanked Rock-wallabies to Gouldian Finches and Golden-backed Tree-rats, Martin made an extraordinary contribution to slowing and reversing the extinction crisis in Australia. Few people, if any, have made such an immense contribution to the conservation of Australia's native wildlife.

The initial catalyst for Martin was a 1991 visit to Warramong Sanctuary, a 40 hectare fenced area in the Adelaide Hills, which protected potoroos, bettongs and other small mammals. Established by Earth Sanctuaries Ltd (John Wamsley), Warramong showcased the value of excluding foxes and cats. The sight of these endangered mammals thriving in the absence of feral cats and foxes was, as Martin described it, his "lightbulb moment".

For those who had the pleasure of knowing Martin, it is easy to imagine him walking around Warramong and deciding, without any hesitation, that he would take on the massive challenge of establishing his own feral-free sanctuary in Western Australia. Within 12 months, Martin had located and purchased a suitable site in the Perth Hills: Karakamia was born.

Martin may have acted initially on impulse, but the seed of deep conviction had been sown. Thus, an enterprise that began in 1991 with a single, ground-breaking step in the Perth Hills would grow, under Martin's leadership and with support from thousands of people around the country, into the largest non-government conservation estate in Australia. Australian Wildlife Conservancy now owns and manages 23 sanctuaries covering over 3 million hectares (7.4 million acres). More than 80% of all terrestrial bird species and 67% of all terrestrial mammal species are found on one or more AWC properties.

In the following paragraphs, we highlight some of the key steps in the establishment and development of AWC in order to highlight Martin's immense contribution to conservation. He was a man who truly led by example and, in so doing, pioneered many key conservation strategies and helped inspire the growth of environmental philanthropy in Australia. More than all of this, Martin was a dear friend, a mentor and an inspiration to all of us at AWC. With your continued support, we will honour Martin by continuing to build on his wonderful legacy.



Hands on during the fence construction at Karakamia



Martin and a Black-flanked Rock-wallaby at Paruna

Karakamia (1991/94)

Karakamia was officially opened in 1994 by the then Premier of WA, the Hon. Richard Court AC. It marked a pivotal moment for the private (non-profit) conservation sector in Australia – the first large, ecologically significant feral-free fenced area on mainland Australia. With strong support from the WA Department of Conservation and Land Management, Martin and his team released a range of threatened mammals including Woylies, Quenda and Western Ringtail Possums.

For perhaps the first time in Australian history, a non-profit organisation was delivering large-scale on-ground conservation for a suite of threatened mammals. The ongoing importance of Karakamia (and feral-free areas generally) is highlighted by its Woylie population, which has been stable at 400 – 500 individuals despite a catastrophic decline in the population elsewhere over the last decade.

Paruna (1998)

Encouraged by the success of Karakamia, Martin funded the acquisition of several adjacent properties along the Avon River to form Paruna Wildlife Sanctuary. It marked another historic private-public collaboration, with Paruna forming a 14 kilometre corridor linking two national parks (Walyunga and Avon Valley NPs). Launched by Tim Flannery and State and Federal politicians in 1998, Paruna is the site of a successful reintroduction of one of Martin's favourite animals, the Black-flanked Rock-wallaby.

Faure Island and Mt Gibson (1999)

With Paruna launched, Martin agonised briefly over the choice between two exciting conservation opportunities before deciding to fund the acquisition of both Faure Island (5,000 ha) and Mt Gibson (132,000 ha). It was a significant step prompted in part by Martin's belief that the challenge of saving Australia's wildlife was too great for Government alone - the private (non-profit) sector would need to play an increasingly important role. In pursuing the acquisition of Faure Island, Martin was among the early conservationists who recognised the immense contribution that feral-free offshore islands would play in saving Australia's mammals.

Mornington (2001)

In 2000, the conventional wisdom was that northern Australia was biologically intact. We now know that the catastrophic decline in northern Australia's fauna was, at that time, already well underway. Martin's decision to fund the acquisition of Mornington Station, covering over 300,000 hectares in the central Kimberley, was historic on two grounds: it was the first non-government conservation reserve in northern Australia and it was the largest private conservation project ever undertaken in Australia. AWC's subsequent success in delivering landscape-scale fire management and feral herbivore control from our base at Mornington has been a showcase for ecological restoration in northern Australia.



Martin at Mornington



LEFT:
Martin with fellow AWC Director,
Tim Flannery, at Scotia in 2002
R Stevens

BELOW:
Martin receives the 2006 Prime
Minister's Environmentalist
of the Year Award on behalf
of AWC with the now Federal
Environment Minister, Greg Hunt

Mt Zero (2002)

In 2002, AWC took a significant step toward achieving Martin's vision of a national, non-profit organisation that could help lead the way in reversing Australia's extinction crisis. The acquisition of Mt Zero, in north Queensland, was funded by a grant from the Federal Government, a major gift from the Wind Over Water Foundation and support from thousands of people around Australia. Mt Zero was AWC's first acquisition outside Western Australia.

Scotia, Yookamurra, Buckaringa and Dakalanta (2002)

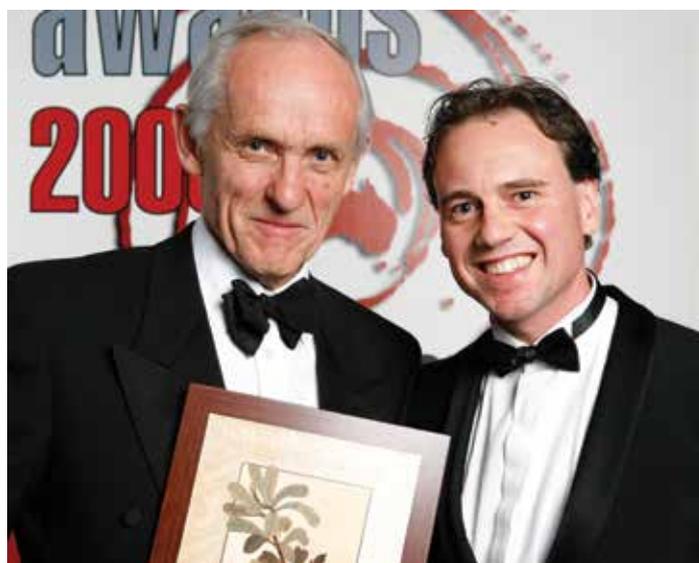
Also in 2002, AWC acquired four properties from the publicly listed Earth Sanctuaries Ltd including Scotia and Yookamurra. Martin provided the largest single donation to support this acquisition, which represented a significant expansion for AWC into eastern Australia. AWC rebuilt the feral-proof fences at Scotia and Yookamurra, allowing populations of Bilbies, Bridled Nailtail Wallabies, Numbats and Burrowing Bettongs to increase substantially. It was a transaction that affirmed Martin's belief in the philanthropic business model, as well as proving the value of large, feral-free areas.

PM's Environment Award (2006)

In 2006, AWC was honoured with the Prime Minister's Environmentalist of the Year Award, which was accepted by Martin on behalf of AWC staff and supporters at a special event in Melbourne. The award recognised AWC's substantial on-ground achievements and our leadership in helping to establish a new model for conservation in Australia.

Northern Australia: Pungalina (2008) and the Artesian Range (2011)

Since the acquisition of Mornington and then Mt Zero, AWC had been steadily building a portfolio of exceptional properties in northern Australia. Martin made significant investments to support the acquisition of Pungalina (2008) and to ensure that the Artesian Range (2011) could be secured for conservation. The Artesian Range was of particular importance to Martin as it lies in the heart of the only region in Australia to have suffered no mammal extinctions since European settlement.



Inaugural Chair of AEGN (2008)

Martin played a leading role in establishing an Australian environmental funders group - the Australian Environmental Grantmakers Network (AEGN). As the AEGN's inaugural chair, Martin helped shape its development as an influential and effective organisation.

Order of Australia (2010)

In 2010, Martin was honoured by being made a Member of the Order of Australia for his services to conservation and the environment. We all know Martin as a humble man who preferred to stay out of the spotlight: he reluctantly agreed to celebrate receipt of the award as part of his 70th birthday party at Karakamia.

Sophie joins Martin on the AWC Board (2014)

Martin's three children – Sophie Chamberlain, Natasha Knights and Sam Copley – are supporters of AWC through the family's charitable foundation. Earlier this year, Sophie joined Martin on the AWC Board, ensuring the Copley family's leadership and involvement with AWC will continue for many years to come.

Leading the fight against feral cats



AWC field staff tracking feral cats with our specially trained cat-detector dogs *W Lawler*

Feral cats are killing in the order of 75 million native animals every night across Australia. They are the most significant threat to our native mammals, with species such as the Numbat, the Bilby and the Brush-tailed Bettong (Woylie) at risk of extinction as a result of feral cats. Cats are also having a significant impact on our native birds, reptiles and amphibians.

Australian Wildlife Conservancy is leading the way in seeking to develop practical strategies that will reduce the impact of feral cats:

- AWC is implementing the largest feral cat research program in Australia.
- We have undertaken the first field research which examines how the hunting behaviour of feral cats is influenced by different land management prescriptions – i.e. how cats alter their hunting in response to different fire patterns and grazing regimes.
- We are pioneering innovative techniques, including the use of customised video cameras mounted underneath collars and a team of specialist cat detector dogs, which have helped us shed new light on cat behaviour and ecology.

AWC is the only conservation organisation in Australia to adopt a holistic strategy to address the feral cat crisis:

1. We are establishing a network of large, feral cat-free areas, utilising conservation fencing, to protect and restore wild populations of Australia's most vulnerable mammals. AWC manages more cat and fox-free land on mainland Australia than any other organisation.
2. Outside of these large feral-free areas, AWC is implementing landscape-scale management prescriptions which should reduce the ability of feral cats to hunt effectively. Informed by our research outcomes, these land management prescriptions involve the management of fire, grazing and dingo populations to disadvantage cats.
3. We will expand our research program to continually improve our understanding of cat ecology and behaviour. In the short-term, this will allow us to refine our land management to further limit the impact of cats. In the longer term, we hope to identify an Achilles heel which will help eradicate feral cats or substantially reduce their densities.



Feral cats caught on camera trap



An ecological crisis: the impact of feral cats

Cats have been the single biggest contributor to Australia having the worst mammal extinction record in the world in modern times. Feral cats have plundered our native wildlife: a recent analysis by some of Australia's leading mammal experts for **The Action Plan for Australian Mammals** (Woinarski et al., CSIRO Publishing) concluded that, for terrestrial mammals, "the threat with the greatest overall impact was *predation by feral Cats*".

Historically, mammal extinctions have been concentrated in southern Australia - where the impact of cats has occurred in combination with the impact of foxes, land clearing and feral herbivores - but northern Australia is also now being affected, and more species will be lost unless a strategy can be developed which reduces or eliminates the impact of feral cats. Unfortunately, there is no easy solution - feral cats are difficult to control using existing methods. Their cautious behaviour makes them hard to shoot or trap; the effect of poisoned baits is limited (because cats prefer live prey); and there are currently no biological control options. To the extent that traditional methods (shooting, trapping and baiting) can be deployed to remove cats from a location, immigration from surrounding areas soon restores local cat populations.

The Federal Government's statutory *Threat Abatement Plan for Predation by Feral Cats* cites a population estimate of 18 million feral cats. Cat density is highly variable across Australia (e.g. cat densities are higher in more productive areas) and also varies strongly over time and with rainfall, particularly in areas like the inland deserts which have irregular weather patterns. Based on the available published studies, including AWC's own work, AWC uses a conservative population estimate of 15 million feral cats; the number is likely to be higher. However, the more relevant issue is the impact of these feral cats.

There are a range of published studies showing that cats kill up to 30 native animals per night. We use a conservative estimate of an average of five native animals killed each night by each feral cat, hence, **feral cats across Australia are killing in the order of 75 million native animals per night**.

Most importantly, there is clear evidence that cats are continuing to drive declines in our wildlife, especially native mammals:

- Across Australia the presence of cats is the best predictor of declines in mammals which are in the preferred size range of cats (100-200 grams).
- Mammal species that have declined on the mainland have persisted on cat-free islands, except when cats have been introduced to the island (in which case the vulnerable mammals have disappeared).
- Feral cat eradications from Australian islands and from fenced "mainland islands" have resulted in dramatic recoveries of threatened species (e.g. Faure Island in Shark Bay; Scotia in western NSW).
- Cats have caused the failure of a number of attempts to reintroduce mammals into unfenced areas.
- Cats do not need to be at high densities to cause damage: there are examples of one or two cats causing local extinctions of native species.

Given the scale and urgency of the threat posed by feral cats, AWC is undertaking Australia's largest feral cat research program involving ground-breaking science which has led to major new discoveries about feral cats. Our research outcomes are already shaping our land management strategies in a way that we expect will reduce the impact of cats. Focused initially in northern Australia, especially the Kimberley, our research program involves the most detailed study ever undertaken of the density, impacts, ranging and hunting behaviour of feral cats.



AWC ecologists Dr Sarah Legge and Dr Hugh McGregor fit a radio-collar to a feral cat *E Young*

Breaking new ground with our feral cat research program

The attributes of cats that make them hard to control also make them hard to study, which is why there was so little information about cats before AWC began our research. We needed to get creative if we wanted to make progress. First, we developed a combination of novel field methods. To improve our ability to catch cats, we trained dogs to track their scent trails and corner them up trees (where we could net them or sedate them using a tranquiliser gun). We took advantage of the most recent technological advances, including affordable camera traps (which we deployed in arrays to measure cat density and home range size), and miniaturisation of GPS collar technology (which we used to follow cat ranging behaviour in fine detail). We also adapted new technology, by custom-creating small video cameras mounted underneath collars, which gave us a cat's eye-view of the world, including where, how and what they hunted.

Second, we needed to collect data in a rigorous, question-based framework. In particular, we placed GPS devices on cats exposed to different 'experimental treatments' (i.e. different fire patterns and grazing regimes) with a balanced sampling design. This had never been done before. Other studies had simply collared cats and watched what happened. AWC is the only organisation which has integrated our science and land management in such a way that we can rigorously measure the impact of our land management interventions – in this case, by measuring how the behaviour of feral cats is influenced by different grazing and fire management patterns. In other words, AWC is the first organisation to generate data which is helping to explain why cats use the landscape, responding to different fire/grazing regimes in a particular way – a critical first step in developing strategies that can limit their hunting efficiency.



AWC was the first organisation in Australia to fit customised video cameras to feral cats, providing a unique insight into cat hunting behaviour

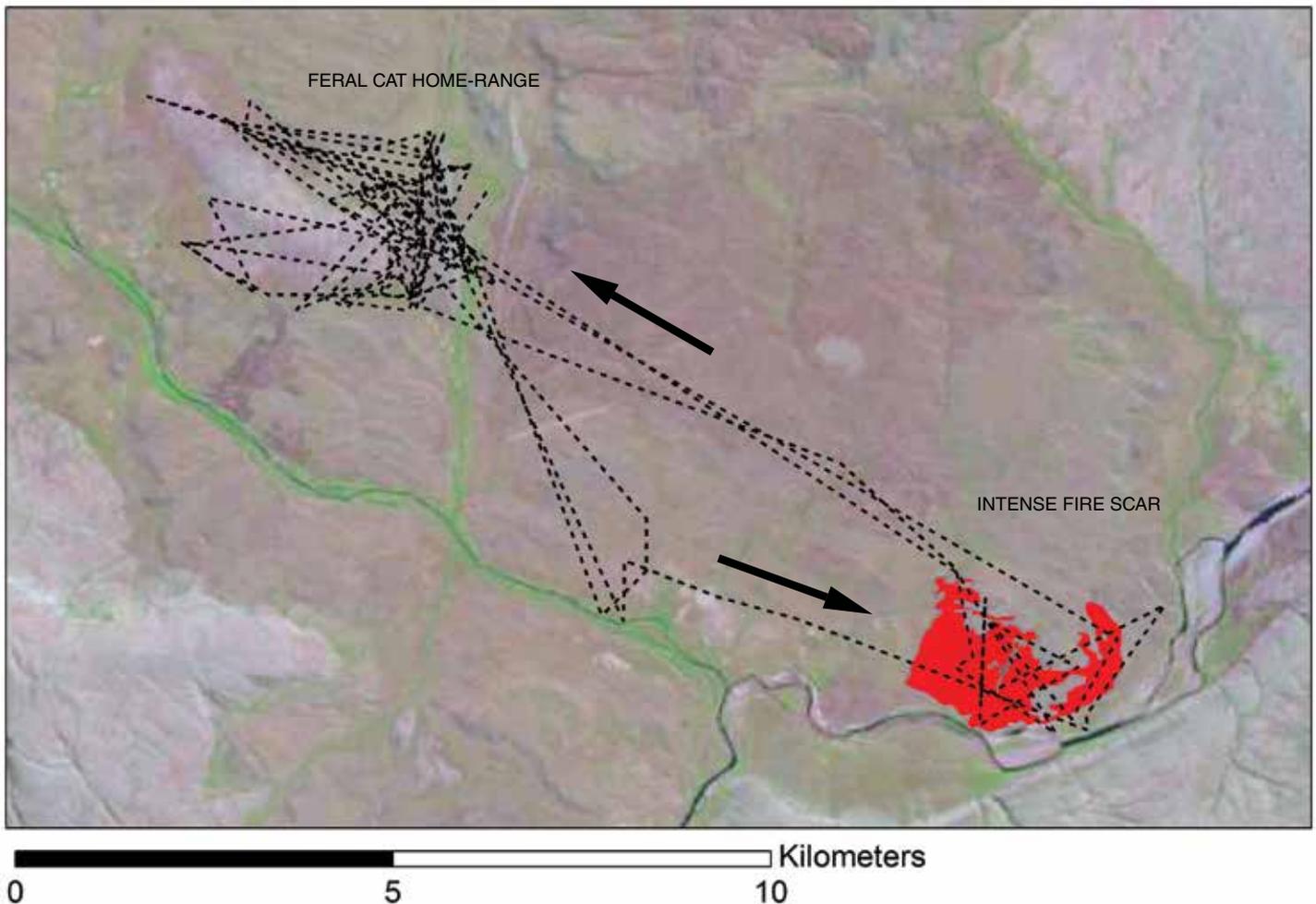
Finally, we tackled the problem from different angles. As well as studying cats themselves, we also looked at cat impacts from the perspective of small mammals. This involved studying individual small mammals and identifying how the risk of cat predation varied in different types of fire.

The cat's eye view

Hugh McGregor (AWC PhD student and now staff member) spent three years at Mornington Wildlife Sanctuary unravelling what makes feral cats tick. From the tiny video cameras which he custom-made and then mounted underneath collars, Hugh was able to provide the first ever detailed insight into feral cat hunting behaviour:

- Hugh found that feral cats hunt frequently and at every opportunity (even rousing from sleep to pounce on passing prey).
- On average, each cat hunts 20 times each day, and they are successful on 30% of these hunts (i.e. killing seven animals a day).
- Cats prey on a variety of different animals – snakes, frogs, lizards, birds and small mammals – but they only eat two-thirds of the animals they kill. The remaining one-third is 'overkill'.

The most significant finding from Hugh's analysis of the collar-mounted camera footage was that the success of hunting attempts was over three times higher in open habitat compared to thick grass or rocky habitats. Feral cat prey is usually much smaller than the cat itself, and the hunted individuals are able to evade the cat more easily if they can squirm through gaps and around corners that the cat is too large to navigate. On the video footage, dense grass tussocks and jumbled rocks with small crevices repeatedly 'saved' the lives of potential victims.



GPS radio-collar tracking revealed that following an intense fire, cats would travel up to 15 km from their territories in order to hunt along the fire scar. The above map illustrates one cat's movements over a three month period at Mornington Wildlife Sanctuary in the Kimberley.

The GPS radio-collar information revealed that cats use the landscape in order to optimise hunting time in relatively open habitats. Within their territory, cats spend most time in areas that have been recently burnt in high-intensity fires, especially if that burnt habitat was normally rich with mammals.

Tellingly, cats were not attracted to areas in their territories which burnt in low intensity fires. The critical difference between fires of low versus high intensity is that some vegetation remains unburnt (thus providing some complex ground cover) in the low intensity fires, but there is usually no cover left whatsoever after a high intensity fire, evidently making it a fertile hunting ground. In fact, the scorched earth result of an intense fire was so attractive to cats that they would leave the relative safety of their territories and make long distance forays to burnt areas up to 15 km away (crossing the territories of other cats and of Dingoes that will gladly kill cats). Cats would spend up to two weeks hunting in the high intensity fire scar before returning home; some individuals revisited the fire scar a number of times in the months following the fire event.

Using our data on the density of cats in the Kimberley savannas, the distance they would travel to capitalise on a high intensity fire scar, and the length of time they would hunt there, we were able to calculate that the predation risk to a native mammal living in those areas was elevated up to 16-fold after the fire. We also found that cats spend more time in mammal-rich habitats if those habitats have been grazed; like fire, grazing opens up the ground layer, making potential prey more 'accessible' to cats.

The discovery that cat hunting behaviour and hunting success is highly sensitive to the structure of vegetation on the ground is the most significant scientific breakthrough to date in relation to the feral cat issue in Australia - it is the Rosetta Stone of AWC's research program and provides our best guide at this point in time for how to manage habitats to reduce cat impacts.

The native mammal's perspective

In a related study carried out by Lily Leahy (AWC Honours student), we used trapping and intensive radio-tracking to follow the fates of individual small mammals (Pale Field Rats and Western Chestnut Mice) following experimental fires of high and low intensity. We found that mortality increased 21-fold for Pale Field Rats in the two months following an intense fire, compared to mammals in a matched, neighbouring unburnt area. Following low intensity fire, mortality increased only 7-fold. In other words, Pale Field Rats were three times more likely to die if they lived in an area affected by a high intensity fire compared to a low intensity fire.

We were able to exclude as factors both migration out of the area (the radio-collared rats didn't move out of their home ranges following the fire) and starvation (there were no differences among treatments in the condition of animals). We retrieved the carcasses of most of the radio-collared animals that died, and were able to attribute the mortality mainly to cat predation. A network of camera traps confirmed a strong increase in cat activity that coincided with this small mammal mortality. In addition, cats in the vicinity wearing radio-collars at the time were recorded making long-distance forays to the experimentally burnt study area. The outcome of our research on the fate of individual small mammals is therefore consistent with the results of Hugh's study on the relationship between fire and the hunting behaviour of feral cats.



Pale Field Rat *W Lawler*

Extending our search for solutions to the feral cat crisis

AWC's Kimberley research has provided a mechanistic explanation for how the increased frequency of intense fires and grazing can amplify the impact of feral cats and lead to a population decline in native mammals. Equally, the research tells us that we could reduce the impacts of cats by managing fire and grazing to increase vegetation complexity, and thus make life much harder for a hunting cat. We believe that the notable mammal recovery at Mornington over the past decade, in contrast to the declines that are reported from elsewhere in northern Australia, is underwritten by these processes.

We need to test the broad applicability of these results for north Australia by repeating elements of the Kimberley research at other sites with different vegetation types, cat densities, prey densities and fire and grazing histories. We need to also factor in the significance of different Dingo densities. We know that Dingoes malevolently harass cats. A potentially significant outcome from our Kimberley research is that almost one third of the collared cats were apparently killed by Dingoes. We need to find the ingredients and the recipes for 'ecological control' of cats across large landscapes – harnessing factors such as the benefits of fire and grazing management, as well as Dingoes - so we can improve the prospects for native species.

In southern Australia, such ecological control of cats is complicated by two things. First, foxes are also present south of the tropics and exert heavy pressure on native fauna. Although we have more options for controlling fox populations at reasonably large scales (because they are easier to bait, trap and shoot), the outcomes of reducing fox numbers can be offset if cats respond with a compensatory increase.

As a result, fox control may need to be married with cat control (which is challenging). Second, in areas where Dingoes are still present, the interactions between the three mammalian predators are more complex (Dingoes suppress foxes and cats, and foxes suppress cats). We need to understand the mechanics of these interactions, and then find ways of manipulating the landscape (e.g. through fire and herbivore control, or enhancing Dingo populations) to disadvantage cats and foxes. In arid areas, where native fauna is often concentrated at specific spots in the landscape, intensive fox and cat control may be most effective if directed at these refugia at critical times.



AWC field ecologist Dr Hugh McGregor setting a camera trap at Brooklyn *W Lawler*



Dingoes suppress foxes and cats *W Lawler*

The urgent need for a network of feral cat and fox-free areas

Our research to date indicates that we have options to explore for reducing feral predator impacts across large landscapes, and that this will benefit many native species. However, it is highly likely that several of our most threatened mammals – such as Mala, Boodies and Stick-nest Rats – will, at least for the foreseeable future, only survive in areas that are cat and fox-free. For many of our most threatened mammal species, the only option for protecting and restoring populations on mainland Australia is to establish a network of large, feral-free fenced areas (mainland islands). Even for species such as Numbats, Bilbies and Woylies, where there are some small populations clinging to survival outside fenced areas, the only hope for establishing populations with densities approximating their pre-European state will be through reintroduction to mainland islands.

AWC is leading the way in the development and implementation of conservation fencing for mainland islands. We are the only organisation to have established multiple, large feral-free areas including Scotia, Yookamurra and Karakamia, with Mt Gibson currently being established (see pages 12-15). Such areas are already generating substantial ecological returns and will be essential in preventing feral cats from consigning more Australian mammals to extinction.

The Artesian Range: a fragile refuge from feral cats

Many northern Australian mammal species have disappeared or been severely reduced in the Northern Territory and Queensland, persisting now only in the north-west Kimberley, including the Artesian Range. One part of AWC's feral cat research program aims to find out why mammals have persisted in places like AWC's Artesian Range Wildlife Sanctuary despite their declines elsewhere. Rosie Hohnen (AWC PhD student) carried out 'extreme fieldwork' to answer this question for her PhD thesis, spending two months at a time camping in very basic conditions, radio-tracking Golden-backed Tree-rats and Wyuldas across the rugged sandstone terrain despite cyclones, floods and fires. Rosie found that cat densities in the Artesian Range are very low. More importantly, the topographically complex terrain provides cover for mammals even after intense fires. Intersecting this finding with Hugh's results about cat hunting behaviour explains why the impact of cats has been less significant in the north-west Kimberley, leaving it for now as the last refuge for several threatened mammals.

*AWC's feral cat research program involves a range of partners including the University of Tasmania (Professor Chris Johnson), the Northern Australian Hub (NERP) and the WA Department of Parks and Wildlife.

Mt Gibson: creating the largest feral predator-free area on mainland Western Australia



The 43 km feral-proof fence will protect nine of Australia's most threatened mammals including Bilbies, Numbats and Woylies *W Lawler*

The creation of a 7,800 hectare feral-free area is set to make Mt Gibson Wildlife Sanctuary one of the most important sites in Australia for the conservation of endangered mammals. Free from the threat of predation by feral cats and foxes, nine nationally threatened mammal species will be reintroduced to Mt Gibson between 2015 - 2018. This single project will increase the global population of five of these threatened mammal species by at least 20%.

Project key facts:

- The construction of a specially designed 43 kilometre fence at Mt Gibson is a key step in establishing the largest fox and cat-free area on mainland Western Australia (7,800 hectares).
- AWC will reintroduce nine of Australia's most endangered mammal species - the Bilby, Numbat, Woylie, Western Barred Bandicoot, Shark Bay Mouse, Red-tailed Phascogale, Greater Stick-nest Rat, Banded Hare-wallaby and Chuditch.
- This single project will help provide a more secure future for 14% (one in seven) of Australia's 63 nationally threatened mammal species. The project will increase the global population of five of these species by at least 20%.



The Mt Gibson project will increase the global Numbat population by an estimated 20% *W Lawler*



Regular inspections of the feral-proof fence are essential in maintaining its integrity *W Lawler*

Construction of the 43 km feral-proof fence

Construction of the 43 kilometre feral-proof fence at Mt Gibson was completed in June 2014. The location of the fenced area was determined after a detailed analysis of habitat types matched against the requirements of each candidate mammal species. This analysis – the first of its kind in Australia – helped identify a diverse 7,800 hectare area of eucalypt woodland, mixed shrublands and acacia dunefields which is designed to optimise the carrying capacity of the nine threatened mammal species.

The specially designed fence took almost nine months to build, with various challenges including material shortages and engineering challenges associated with drainage lines. The fence is 1.8 metres high, with a floppy top and two mid-height electric wires. It has two skirts (internal and external) which lay flat on the ground to prevent burrowing under the fence.

AWC has more experience than any other organisation in Australia with conservation fencing, being the only organisation to have established multiple, large feral-free fenced areas. In terms of the integrity of our fences, our record is exceptional. Over the course of a combined 43 site-years, we have experienced incursions by feral predators on fewer than five occasions; in each case, the feral predator was detected (by tracks, camera traps, or observed) quickly, and then removed, without any measurable impact on the native species within the fenced area.

The Mt Gibson fence includes:

- 86 strainer post assemblies
- 4,320 intermediate posts
- 216 kilometres of plain wire
- 129 kilometres of 900mm netting
- 32,240 individual ties
- 8,640 insulators and insulator standoffs



Insulators being fitted on the electric wires *M McFall*



Installation of skirting *M McFall*



Specially designed "floppy top" feral-proof fence *M McFall*



Feral eradication is underway at Mt Gibson, using targeted trapping such as humane soft-jaw traps pictured above *W Lawler*

Removal of all feral animals from 7,800 hectares at Mt Gibson

With construction of the fence complete, the current priority at Mt Gibson is the removal of all feral animals from within the fenced area. Goats have already been removed. There has been no evidence of foxes for several weeks; surveillance will continue although it is likely the fenced area is now fox-free. The focus is now on the eradication of rabbits and feral cats. Six feral cats have been removed since completion of the fence.

The strategy for removing the remaining rabbits and cats involves a team of land managers and ecologists. An array of camera traps and intensive track surveys are being used to identify the distribution of rabbits and the ranging patterns of cats. Targeted baiting, trapping and shooting are carried out in areas frequented by each species. Our aim is to ensure the 7,800 hectare area is feral-free by mid-2015. The Mt Gibson feral-free area and a similar area at AWC's Scotia Wildlife Sanctuary in NSW will be the largest feral-free areas on mainland Australia.



The critical need for feral-free fenced areas

At Astrebla Downs-Diamantina National Parks, the last wild Bilby population in Queensland is on the brink of extinction as a result of feral cats. The estimated Bilby population has declined from 700 to 200 in only a few years. Almost 3,000 feral cats have been shot at Astrebla Downs in that time, without preventing the decline. Unless a feral-proof fenced area is established, the last wild Bilby population in Queensland will be extinct within a few years.

Mt Gibson is expected to support a population of more than 600 wild Bilbies *W Lawler*

The return of endangered mammals

Meanwhile, AWC ecologists have been busy planning for the subsequent reintroduction of threatened mammals during 2015 - 2018. A key step in this process involved an on-site planning session in late October with senior scientists from the WA Department of Parks and Wildlife (DPaW). Over two days at Mt Gibson, AWC and DPaW ecologists reviewed the extent and quality of habitat for each threatened mammal species and discussed the source populations for, and scheduling of, translocations for the candidate mammal species. As part of the planning process, AWC ecologists have updated our projections for the population size of each reintroduced mammal species (see table below). These projections are conservative: typically, animals expand their range of habitats and abundance in environments free of feral predators. We anticipate the project will increase the global population of five of Australia's most threatened mammal species by at least 20%. This represents an extraordinary ecological return on investment and demonstrates clearly the value of large feral-free areas.



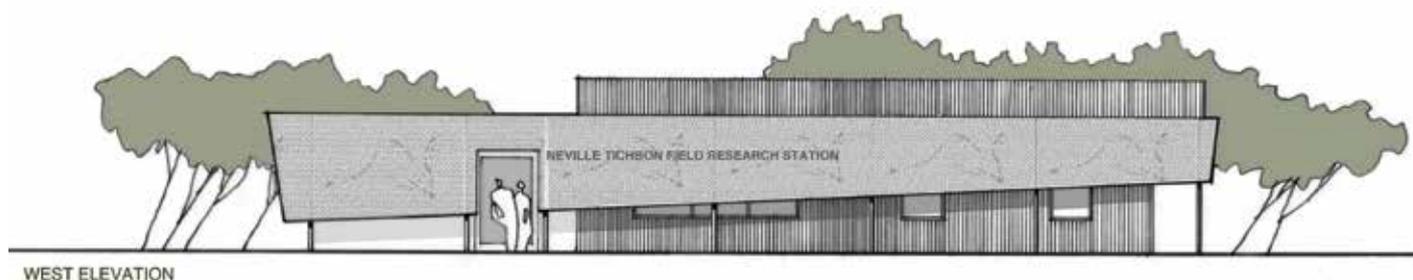
AWC expects to increase the global population of the Banded Hare-wallaby by 55% at Mt Gibson *W Lawler*

Species	Global pop'n size	Projected pop'n size in Mt Gibson fenced area	Increase in global pop'n	May establish pop'n outside fence?*
Western Quoll	12,000-15,000	55	<1%	Yes
Red-tailed Phascogale	<10,000	1,340	15%	Yes
Numbat	<1,000	170	20%	Yes
Western Barred Bandicoot	1,000-5,000	790	30%	
Greater Bilby	<10,000	610	>6%	
Woylie	<18,000	1,470	8%	
Banded Hare-wallaby	2,000-9,000	3,060	55%	
Greater Stick-nest Rat	4,000	1,030	25%	
Shark Bay Mouse	10,000	3,250	33%	Yes

*in conjunction with broadscale feral predator control and the presence of a secure population inside the fence

The Neville Tichbon Field Research Station

Mt Gibson will become an important hub for scientific research on issues related to the recovery of endangered flora and fauna and the restoration of ecosystem processes through, for example, the return of small digging mammals that continually turn over the soil. To support this research, including the involvement of universities and other partners, AWC is establishing the Neville Tichbon Field Research Station at Mt Gibson. The Neville Tichbon Field Research Station, incorporating a lab and other facilities for AWC ecologists, students and visiting scientists, will be a showcase for conservation science in Western Australia. It will be part of a network of similar facilities across the AWC estate including the Sir David Attenborough Field Station in the Artesian Range.



Biological surveys: measuring ecological health



Northern Quoll caught on camera trap at Brooklyn



Papuan Frogmouth at Piccaninny Plains *W Lawler*

Australian Wildlife Conservancy is unique within the non-government conservation sector in that 25% of our staff are field ecologists. This reflects a business model which recognises the importance of science in both designing land management strategies and in measuring the ecological health (natural capital) of our properties.

Our framework for measuring ecological health includes an extensive program of biological surveys across our 23 properties. Each year, we carry out well over 100,000 standard trap-nights. One of the key objectives of these surveys is to track the health of key biodiversity indicators such as the abundance and diversity of ground-dwelling reptiles and small mammals. Tracking changes in ecological health, using site-based data collected within a well-designed monitoring framework, is essential if we are to understand whether our land management activities (such as fire management, feral animal control) are effective at maintaining and restoring biodiversity. In other words, measuring ecological health - and continually adjusting our land management strategies in response to any changes in health - is essential if we are to generate the highest ecological return from our available resources.

Here is a snapshot of some of the results from recent biological surveys across the AWC estate. While the middle two-thirds of the year involved a hectic survey schedule, the upcoming summer months involve more detailed analysis of the massive biological data sets generated during the year.

Brooklyn survey reveals biological treasures

Brooklyn Wildlife Sanctuary is a biodiversity hotspot of global significance - around 40% of all Australia's bird species and 30% of Australia's mammal species are found on this single property. Brooklyn includes substantial areas of rainforest and endangered wet sclerophyll forest including the largest privately owned section of world-heritage area on mainland Australia. Our recent biological survey efforts in this section of Brooklyn have confirmed its importance for a range of mammals with an array of camera traps capturing images of Black-footed Tree-rats and Northern Quolls (both nationally threatened), as well as Giant White-tailed Rats and Northern Bandicoots. Spotlighting in higher altitude country revealed Daintree Ringtail Possums.

While small mammal species remain common on the sheltered rocky outcrops and the steep slopes and gullies of the Mt Carbine Tableland within Brooklyn, ground-dwelling mammals are far less abundant in the flat country and low hills adjacent to the Mitchell River. This reflects the greater impact of past land use on the ecological health of these ecosystems, especially higher levels of grazing. We expect our feral animal control program and complementary fire management to restore the health of these systems over time.

Endangered Cape York Rock-wallaby located on Piccaninny Plains

In addition to tracking a suite of ecological health indicators, our surveys also help us to compile a biological inventory of each property. One of our most notable discoveries during 2014 was the first record of the little known Cape York Rock-wallaby at Piccaninny Plains. The Cape York Rock-wallaby is one of Australia's rarest Rock-wallaby species. Found in less than five locations, it is classified as nationally endangered in the recently published *Mammal Action Plan*.



Bolam's Mouse at Scotia *K Barnes*

The Cape York Rock-wallaby was discovered during a helicopter based survey into the sandstone outcrops and gullies in the far north-eastern corner of the property. In total, the survey team carried out around 3,800 trap nights across the northern section of the sanctuary in a range of habitats including open woodlands, tea-tree swamps and several isolated rainforest patches. Other highlights included records of the Northern Death Adder, Amethystine Python, Red-cheeked Dunnart, Giant Burrowing Frog and Grassland Melomys.

Scotia

Scotia's annual biodiversity survey was undertaken in November, with over 3,700 trap nights conducted across 54 permanent monitoring sites. The sites are in matched habitats within and outside the feral-free area at Scotia. This survey targets small mammals and reptiles, with separate biannual surveys for the larger reintroduced mammals such as Billbies and Bridled Nailtail Wallabies.

Notable survey outcomes included six captures of the Bolam's Mouse and one Stripe-faced Dunnart. Both species are listed as threatened in NSW: the Stripe-faced Dunnart has been caught on only five previous occasions at Scotia since 2006. Mammal captures remain greatest within our feral-free areas, with 61 native mammal captures compared to only 15 captures outside the feral-free area. The most common mammal species captured during the survey was the Southern Ningai (also threatened in NSW), which accounted for almost 40% of all native mammal captures.

Forty-eight species of reptile were recorded, including two captures of the threatened Mallee Slender Blue-tongue — a species which has not been captured at Scotia for nearly 10 years. Also of interest were three Bandy Bandy captures,



AWC ecologist Felicity L'Hotellier with a Western Blue-tongue Lizard *S Chadlowe*

a snake which had been recorded only seven times since 2006, and several sightings of the threatened Western Blue-tongue. Other threatened species to be recorded included seven Marblefaced Delma, 12 Ringed Brown Snakes and two Jewelled Geckos.

Bowra

Although renowned for its spectacular birdlife, it was mammals and reptiles that took centre stage during a two week survey at Bowra. A highlight of the survey was the capture of four Giles Planigales and four Stripe-faced Dunnarts, all except one with large numbers of pouch young. Three mammal species were also confirmed for Bowra for the first time during this survey: the Little Cave Bat, Brush-tailed Possum and a Bristle-faced Freetail Bat. Numerous snakes were recorded during the survey including Ringed Brown Snake, Strap-snouted Brown Snake, Dwyer's Snake, Curl Snake, Mud Adder, Red-naped Snake and Carpet Python.



AWC ecologist, Rigel Jensen, releases a freshwater crocodile during the Piccaninny Plains survey *J Kemp*

Establishing the first feral herbivore-free area in the Gulf of Carpentaria



The Gulf Snapping Turtle is a 'living fossil' – it was first described as a fossil from Riversleigh before being recognised as an extant species. This endangered turtle is restricted to rivers flowing into the Gulf of Carpentaria, including the Calvert River which flows through Pungalina-Seven Emu *W Lawler*

The creation of an 80,000 hectare feral herbivore-free area at Pungalina-Seven Emu Wildlife Sanctuary is a step closer with the completion of a 35 km section of fence before the wet season. The fence runs parallel to the coast and then veers south to meet the escarpment in the Calvert River catchment and will prevent large feral herbivores from impacting a variety of sensitive coastal habitats including important coastal wetlands, riparian forest and eucalypt woodlands.

Significantly, it represents the only feral herbivore-free section of coastal land on the Gulf of Carpentaria and will be one of the three largest feral herbivore-free areas on mainland Australia (along with AWC's Wongalara Wildlife Sanctuary and Mornington Wildlife Sanctuary).

The feral herbivore-free area promises to deliver significant ecological returns for many threatened species that have a stronghold on Pungalina such as the Carpentarian Pseudantechinus, Gulf Snapping Turtle and Northern Brown Bandicoot.

Preparations are underway to undertake an intensive feral herbivore control program to remove cattle, horses, donkeys and pigs from the area.



AWC Sanctuary Manager John Barton at the Pungalina-Seven Emu feral herbivore-proof fence *W Lawler*

Please support the Pungalina feral herbivore-free project: a tax deductible gift of \$100 will fund the removal of feral herbivores from approximately 20 hectares.

AWC-SWIRE partnership

Protecting Australia's richest nature refuge

Swire has been supporting AWC since 2008. This year, Swire extended its support with AWC to help protect Brooklyn Wildlife Sanctuary: Australia's richest nature refuge. The five year partnership will help to change the way conservation is delivered in biodiversity-rich north Queensland.

AWC supporters will be aware that Brooklyn is the most biodiverse parcel of private land in Australia. Covering 60,000 ha in far north Queensland, Brooklyn straddles an extraordinary gradient - from high altitude rainforest (with annual rainfall over 4,000 mm) to the savanna woodlands of the Mitchell River valley (annual rainfall 600 mm). Over 300 bird species, nearly 90 mammal species and over 1,400 plant species are found here. Indeed, Brooklyn includes the largest block of privately owned world-heritage area on the mainland.

Since the acquisition of Brooklyn in 2004, AWC's focus has been on establishing basic infrastructure, conducting initial biological surveys and implementing fire management. Now, with Swire's support, AWC will substantially enhance the program at Brooklyn, making it a showcase for science-based land management in north Queensland and a catalyst for regional initiatives around Australia. Swire has been operating in Australia since 1855. Today, with a strong commitment to sustainable development, its interests cover a diverse number of industries including cold storage and logistics, specialist bulk logistics, construction and demolition materials recycling and mining services.



Brooklyn is one of the best known sites in Australia for spotting the elusive Blue-faced Parrot Finch *G Jones*

Joan Viner: a bequest which will protect threatened wildlife for future generations

Joan Viner was one of Australia's quiet achievers. She had a deep love for Australia's native fauna and flora and, during her lifetime, was actively committed to its preservation. In her will, Joan left a generous bequest to Australian Wildlife Conservancy which means her legacy will now live on, protecting Australia's threatened wildlife for future generations.

For over 20 years, Joan dedicated herself to restoring native bushland in her local north Sydney area, including Willoughby, Lane Cove National Park and Taronga Zoo. Her efforts earned her numerous awards, including a Community Service Award in 2000 and a Quiet Achiever's Award in 2013.

Joan travelled widely across Australia, from Cape York to the Kimberley. During her lifetime, she became increasingly concerned about the dramatic decline in many of our species. In the north, the Gouldian Finch declined from a population in the millions to an estimated population of only a few thousand breeding adults. Even during the last decade of Joan's life, the Woylie declined catastrophically from over 200,000 to less than 20,000 animals. However, a visit to Mornington Wildlife Sanctuary in July 2007 introduced Joan to AWC and gave her new hope for the future of Australia's wildlife. She was so excited to see the impact that AWC's new model for conservation was having – so happy about our success in



Joan Viner *D Swonnell*

reversing the declines of small mammals and birds like the Gouldian Finch - that she immediately became a passionate advocate and supporter. Sadly, Joan passed away last August but, in passing, she left a substantial bequest to AWC. In keeping with her wishes, Joan's remarkable gift will now be used to protect Australia's threatened wildlife for future generations. Joan's ongoing role in saving Australia's unique animals and plants will be commemorated with a special plaque at Mornington Wildlife Sanctuary.

We are very grateful to Joan, and to all of our 'bequestors', for their generosity. If you would like more information about how your bequest can create a more secure future for Australia's wildlife, please visit our website www.australianwildlife.org or contact Beth Reid on 08 9380 9633.

