

# Urban wildlife management: an emerging discipline

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## ABSTRACT

Urban wildlife comprises those native animals living in habitats that are found in cities and towns. Since most Australians live in cities, this is the wildlife that the majority of people encounter on a daily basis. We consider that this wildlife is a legitimate subject for study, not just as a pale version of research in rural Australia or in national parks and nature reserves. It is the urban environment where many people will form their ethic of care for our native fauna, concern for the conservation of remnant bush and the desire to restore degraded habitats. It is for these reasons that urban wildlife deserves its own roadmap for survival. Much native vegetation is planted in backyards or is rehabilitated in urban green spaces, but whether or not it is a project to restore wildlife, the habitats of urban animals need to be taken into account at the planning stage. The many contributions in this book point the way to seeing how and where this can be achieved. As a basis for such planning, we encourage others to publish the results of their urban studies both in the standard scientific literature as well as in cross-disciplinary publications that provide the opportunity to integrate urban wildlife management with other disciplines.

**Key words:** urban wildlife, urban renewal, urban ecology, wildlife management, bush restoration.

## A seeming self-contradiction

Surely the term “urban wildlife” is an oxymoron, a figure of speech that appears to be a self-contradiction. The *Macquarie Dictionary* (revised 3<sup>rd</sup> edition 2001) defines “wildlife” as animals living in their natural habitat, so the term “urban wildlife” seems contradictory because cities are not usually characterised by their wild animals or natural habitats. National parks and nature reserves, forests, rivers, rural landscapes and the long coastline are typical Australian natural habitats where native animals can be found. Regrettably, this view that native wildlife can be found only in “the bush” divides conservation between the city and the country, between urban-dwellers and rural communities, and generates a false social and political divide that makes no ecological sense. Urban wildlife comprises those native animals living in habitats that are found in towns and cities. A less-restrictive definition is applied by some ecologists and urban wildlife can include exotic non-pest species, such as those introduced birds studied by Recher (2004) that have taken up residence in Kings Park in Perth. Such animals characterise a city, but urban wildlife does not include introduced domestic pet and pest species such as dogs *Canis lupus familiaris*, house mice *Mus domesticus* and black rats *Rattus rattus*.

Like many of the authors in this book, we have chosen to rearrange some of the pieces of the environmental jigsaw in order to present our vision of a modern city that has its own wildlife, its own ecological framework and its own future. We reject the mindset that nature conservation

is an activity that does not occur in the urban landscape. Rather, we argue that managing urban wildlife employs the same principles of ecology, planning and communication as managing wildlife in ‘natural’ habitats, but that the context is novel and demanding. Since most Australians live in cities, urban wildlife will be what most people encounter on a daily basis, and for this reason it could be considered the most important wildlife in Australia. It is a vital link to the natural world for generations of urban Australians and, like wildlife anywhere, it deserves its own terms of reference and its own roadmap for survival.

The first challenge is to view urban wildlife with fresh eyes. To look for a new way of seeing urban wildlife, we stepped outside the profession of ecologists and wildlife managers. We were seeking a language that responds spontaneously to urban wildlife as well as having the literary skills to communicate the complexity of the issues. Journalist and wildlife author James Woodford, in the foreword to this book, has given a captivating display of these attributes. The animals that come alive in his piece are familiar to urban Australians. To capture that sense of rapture and concern, but free of Australian species that may evoke a typical prejudice, we searched the web and found this engaging piece by the journalist C. K. Meena, who wrote the following feature for the online edition of *The Hindu*, India’s national newspaper, on 18 April 2002 ([www.hinduonnet.com/thehindu/mp/2002/04/18/stories/2002041800610300.htm](http://www.hinduonnet.com/thehindu/mp/2002/04/18/stories/2002041800610300.htm)).

“Summer is in and the ants are out again. The city-dweller’s most intimate brush with nature usually takes the form of waging a battle with these irrepressible foot soldiers. But is war inevitable, I ask you. There is no approach more sound, more time-tested, than live and let live. Robert the Bruce’s spider is not a patch on ants when it comes to sheer dogged mulishness (to mix a few animal metaphors). Destroy a platoon, and battalions re-appear. Block the route to the sugar and they are knee-deep in cooking-oil. Surround the oil by a moat filled with water, and you see teams of champion swimmers heading straight for the prize. I learnt my lesson the hard way. I used to wipe ant-friendly surfaces with every form of toxic liquid known to man and insect. At one point, I thought I had made a major discovery when I doused a few thousands with my humble dish-cleaning concentrate and they instantly turned up their toes. The next morning, there they were, bustling about as if the previous evening’s bloodbath were a mere illusion. Then, my wise partner, having witnessed my demented behaviour over the good part of a fortnight, quietly suggested: “Why don’t you leave them alone”. The simplicity of it took my breath away. I allowed the creatures free play in my kitchen garbage and, presto, they stopped swarming all over the place! They had no personal vendetta against me. All they wanted was to plunge headlong into soft and fragrant rot and carry pieces of it home to munch at leisure. Nowadays, when I see those long shimmering lines of ants on the move, along walls and across floors, I flash them a tender smile and carefully

This extended piece from *The Hindu* reflects a growing interest in urban wildlife around the world as more and more areas are taken over for urban development. It also provokes the first question one could ask: “what animals should we include in the category of urban wildlife?” The answer here is that all classes of vertebrates should be included, from Gibbs’ (2004) fish and White and Burgin’s (2004) frogs and reptiles, to Catterall’s (2004) birds and Banks’ (2004) mammals, including those native species that have become pests in urban areas (Ross 2004; Matthews *et al.* 2004). But invertebrates also form an integral part of the urban wildlife picture, and so were included in the forum (see preface) and then this book (Clark 2004, Emery and Emery 2004, Hochuli *et al.* 2004, Hutchings 2004, Yerman and Ross 2004). It is not surprising that invertebrates are part of the picture for those who contributed to a previous Royal Zoological Society of NSW publication, *The other 99%* (Ponder and Lunney 1999), but it will take time to regard lines of summer ants on the kitchen table as urban fauna, although the transition is underway. This recognition foreshadows the need for more guides on how to recognise and manage this wealth of wildlife – how to be able to distinguish a millipede from a centipede and what their habitat needs are. Several such books have appeared over the years (Clyne 1982, 1984, 1993, Smithers 1991, Blaxland 2003), and there is ample scope for more, especially those that take an ecological view of the city and its invertebrates.

We also need to re-examine our attitudes towards animals in the city, starting with the recognition that there are some animals we want to kill, and others we want to attract. Could we ever feel grateful, like the author of the article in *The Hindu*, that a sparrow had taken up residence in

step over them. Live and let live is good for the blood pressure. We, creatures of the city, are so removed from the wilderness that we have no idea of animal behaviour, let alone animal physiognomy. Some of us cannot tell a millipede from a centipede. We look at a flying insect and screech “Wasp!” or “Bee!” depending on whether it appears brown or black. I used to cower and duck whenever a passing tan-coloured visitor would make sorties into my balcony. Over time, it built a sturdy hut in a corner, out of reddish earth that froze like concrete. An older and wiser head than mine told me that it was a harmless variety of mud-wasp which would bring good luck to its host. I wonder if it knew that it had escaped my fly-swat by a whisker. Creatures that do not nip or sting we are prepared to treat politely – as long as they are not cockroaches. I am modestly proud of the lizard colony that inhabits my home. Sometimes you see grandpa stalking a wispy prey, sometimes it is junior stretching his legs beneath the wash-basin, but by and large, they are unobtrusive tenants who respect your privacy. Then there is the kind of wildlife that makes you feel blessed by their presence. I cannot tell you how grateful I feel to the sparrow couple that resides above my bedroom window for having placed their trust in me. Where have all the froggies gone, I wonder during the monsoon, after I almost stumble over a little one hopping painfully over the rough paving stones. Last winter, I felt like I had won a blooming lottery when a gaggle of parakeets stopped over for a noisy breakfast at the pod-laden African tulip tree overlooking my utility area.”

our house? Recher (2004) is willing to extend the concept of urban wildlife to include exotic species of birds in the urban landscape. Thus we need to undergo an attitudinal shift in recognising what constitutes urban wildlife as this will significantly influence plans to conserve the wildlife of our cities. However, while attitude surveys and public education on this point will continue to be essential, it is widely recognised among environmental educators that seeing, touching or working with urban animals will provide the primary key to opening the doors to our urban neighbours. *The Hindu* piece makes the remark that we, as city creatures ourselves, are far removed from the wilderness and know little of animal behaviour. Australians live daily with urban wildlife and rarely with wilderness wildlife, yet when nature conservation efforts seem to favour the natural environment, particularly wilderness (Recher 2002a,b; Recher and Lunney 2003), there is a danger of overlooking the obvious in our endeavours to conserve our natural heritage.

## Recent literature

Some books on how to conserve native animals in human settings start with the animals themselves in a most engaging way. Consider the following opening line: “Watching a scarlet robin as it swoops on an insect or the acrobatic flight of a sugar glider is a wonderful experience” (Lindenmayer *et al.* 2003). Here the authors proceed to lay out a book about wildlife on farms that is ecologically systematic in its treatment of wildlife habitats – trees, understorey, logs, creeks, wetlands – and then makes proposals for integrating farm management with conservation. This is an excellent approach and one we urge others to take up in the next generation of books on urban wildlife. Even

the iconoclastic Tim Low (2002) opens his introduction to *The New Nature* with: “A brown snake visits my Brisbane garden”. The word “visits” juxtaposed with “brown snake” lets the reader know that the author is accepting of even potentially dangerous wildlife in his urban habitat. Writing about Australian urban wildlife contains that embattled sense of danger and transience that is symbolized by the relatively rare pleasure of a visit from a venomous brown snake.

Being a prophet in your own land (or in your neighbour’s backyard) can be hard going (Burgin 2004), so we looked elsewhere. The lucid prose of the English writer Richard Mabey in *The Unofficial Countryside* (1999) was re-assuring. In the first line of the introduction to the Pimlico, i.e. second, edition, Mabey writes: “When *The Unofficial Countryside* was first published in 1973, the idea of celebrating the impromptu wildlife of cities was regarded as mildly eccentric”. He then adds: “Twenty-five years on, the emphasis is a shade more serious. The wildlife that thrives in cities – both green relics and opportunist newcomers – is now recognized as an important component of the country’s natural diversity. Indeed, it’s welcomed as playing a vital role in the quality of life of the people who live in urban areas”. This is writing that is both ecologically aware and sociologically insightful. Do we really need an Australian primer on the subject when we could just read Mabey? Move onto his next paragraph for this gem: “I still find the thought of foxes stealing through London’s West End at night... hugely uplifting and a metaphor for the resilience and regenerative powers of nature”. We do not intend to spend any space here regurgitating the arguments that demonstrate the ecological mayhem caused by foxes in Australia. We do, however, note the parallel shift in attitude towards urban wildlife in the UK and Australia and recognise the need for books which describe the Australian scene. This book was produced as one such contribution.

## Urban renewal

The term “urban renewal” is defined in the *Macquarie Dictionary* as a phrase meaning “the rehabilitation of urban areas by regeneration, replacement, repair, or renovation, in accordance with comprehensive plans”. Our intention in this book is to propose that wildlife be included in all plans for urban renewal. To date, so many of the management issues, such as managing remnant local bush or individual animal species, are dealt with in isolation and urban wildlife has not been included in the framework of comprehensive plans. Pest native species such as ibis (Ross 2004), seagulls (Temby 2004) or brushtail possums (Matthews *et al.* 2004) are managed on a species by species basis, as are threatened species such as penguins (Bourne and Klomp 2004), snails (Clark 2004) and bandicoots (Banks 2004). Such studies, and the specific management plans that follow, have provided evidence of success of identifiable initiatives, techniques and problem-solving mechanisms, but the majority of species do not fall into either pest or threatened category and thus do not trigger such a response. In any case, it does not make sense to tackle all of the urban

conservation issues on a species by species basis. In the long term, urban wildlife needs to be part of an urban renewal plan, a catchment plan, an overall plan for biodiversity, and urban wildlife ecologists need to be part of the integrated planning process. To achieve such an integration requires the formal recognition that urban wildlife conservation needs special attention beginning in the planning phase of any urban renewal programs.

Both Commonwealth and State governments have focused much of their conservation effort on pest or threatened species. Local government has focused more on “green” spaces than fauna habitat because spaces such as parks and reserves fit within the urban planning paradigm. Urban wildlife has, therefore, not yet been identified as a study in its own right, but the need is developing urgency as urban wildlife becomes increasingly assessed in the context of future community needs.

## The state of Australia’s biodiversity worsens

In the *Biodiversity* theme report (Williams *et al.* 2001) of the *Australia State of the Environment Report 2001*, the grim conclusion was that, “Overall, the condition of biodiversity in Australia today is poorer today than it was in 1996”. The report noted that “since many of Australia’s habitats have already been heavily modified for human purposes, steps to save biodiversity need to also include measures to maintain diversity on lands and in waters that have been disturbed”. The report stressed the importance of “grasping the complex links between modified and natural systems as a basis to inform management”. In this context, urban wildlife presents a special case for study and management. It is not just a difficult end of the spectrum, the basket case in any triage of our precious conservation dollars. Quite the contrary. The value of any effort expended to conserve urban wildlife will be vast if it is measured as a total of the return per person since most Australians live in cities. A great advantage of programs to conserve urban wildlife is that the results will be immediately seen, such as an increasing richness in the daily dawn chorus of birds, or in mammal visitors at dusk, or the croaking of frogs on hot, wet evenings, or lizards visibly basking on warm, sunny mornings. Further, the educational value of urban wildlife is already providing both primary and secondary lessons in biodiversity for most Australians. The urban setting is the environment where so many people will form their ethic of care for our native fauna, concern for the conservation of remnant bush and desire for the restoration of degraded habitats.

The two editors of this book are among the first wave of the post-war baby boomers. When we were in primary school, the then Bank of New South Wales (1956) (later renamed Westpac), produced a book entitled, *Australia for the visitor*. In the chapter on *The Wildlife of Australia*, the first paragraph just sparkled with a neat summary of the standard views of wildlife that filled our youth: “Australia does not possess the wide variety of native animals and birds found in the other continents, nor has it fierce and

colourful beasts that capture the imagination. But its wild life nevertheless has one distinctive quality: much of it is extremely primitive; a lingering relic of prehistoric life which has long disappeared from other countries." An intelligent visitor might take a different view, but possibly the greatest damage was done to the minds of the bank managers and those to whom they advanced loans to "develop" Australia before the word ecologically sustainable development was on the political horizon.

To the malleable young Australians in primary school at the time, the generation now in the senior decision-making positions, it was nearly impossible to foresee the desperate language contained in Williams *et al.* (2001). Nevertheless, there were clues, insights and good ideas that did enable the world to change. Let us consider one intelligent visitor of 40 years ago – David Attenborough. In his book *Quest under Capricorn*, Attenborough (1963) recounted his journey in the Northern Territory. Besides filming birds and many other animals, Attenborough's objective was to bring back a series of films that would give a rounded picture of the Territory – its people and landscapes, as well as its animals. He concluded his quest with a spiritual dimension: "When the painting was complete, Charlie went over to another crevice that has been carefully stopped with sprigs of leaves. Removing them, he took out half a dozen flat stones. One of them, longer than the rest, was the tongue of the ancestral dingo. The rest were relics associated with the snake. He made some ochre by rubbing a red pebble on a rough flattened boulder that, from its shape, had been used many times in the past for the same purpose. Together the men smeared the powder on the holy stones and over their bodies. As they did so they chanted murmuringly. They were priests telling their rosaries, handling the relics of the eternal. They were in communion with the gods. For them the past was once more alive. This was their totem place. From here, their spirits had sprung and here, at death, they would return. The world of the white man no longer existed".

These insights were available for those with an interest in nature study, as it was then known, and they conjure up the link between art, memory and a spiritual dimension to the landscape that seems to have little to do with modern urban life. Yet the public artists Turpin and Crawford (2004) intuitively recognised that animals are totems, and by endeavouring to breathe life back into a creek that had become a concrete canal, they conjured up a spiritual dimension which is symbolized by their memory line and their art. David Attenborough is now one of the most respected voices on nature to be heard on television. One could argue that he understands, and is sustained by, the spiritual side of the animals he describes in his now-famous breathless voice, not a spirituality attached to any formal religion but one that simply rests on a reverence for life on earth. It is that dimension that inspires so many Australians to seek to conserve the natural world beyond the cities, and the totem for most people is wildlife and, although yet to be fully recognised, it is predominantly urban wildlife because most people are urban dwellers.

## Bushland or buildings?

*Bushland or buildings?* was the title of a Nature Conservation Council of NSW forum in June 2001 (Newton 2001). There is a timely convergence of thinking between the NCC forum and the RZS forum on urban wildlife. Yet, there remains a gap. The NCC forum focused on vegetation, even though its subtitle was: "The dilemma for biodiversity conservation in urban areas". The key objective of the forum (Messer 2001) was to raise questions about what has to be done to protect urban bushland remnants from further degradation and destruction. The NCC did not include fauna in its framework of ideas. While conserving bushland is a crucial element in retaining urban wildlife, it is not sufficient in itself. Space, as defined by boundaries that appear on maps, can be more readily conserved through the planning system than can wildlife because the latter is not always site-based in its location or needs. This will be a long slow lesson to absorb if the experience of Lunney *et al.* (1999, 2000, 2001, 2002) and Ward and Close (2004) for conserving koalas *Phascolarctos cinereus* through the planning system is any guide. Among the key lessons are that wildlife managers need to be able to define and map the habitat at the level of resolution that fits the cadastral maps used by planners, i.e. at the level of house by house, street by street; that the threats, such as dogs, roads, cars and fires in remnant bush, need to be articulated with recommended actions to reduce them; that the views of the local community need to be sought on both koala presence and management actions that would be accepted; and that publishing the results of both the scientific enquiry and the planning deliberations are an essential part of a planning process that will entail some restrictions, such as on land use, dog control and management of koala habitat across a local government area.

We are fortunate that the NCC regularly publishes its proceedings as these provide a string of valuable insights for reflection. Bourne (2001) identified that "Urban waterways represent a major component of remnant vegetation in urban areas". This should give some joy to Phil Gibbs (2004) who, in this volume, has placed urban fish on the list of urban animals to be conserved. Binning (2001) noted in his NCC paper that, "In the last ten years the conservation of biodiversity within our cities has emerged as a key issue in both urban and conservation planning," but expressed disappointment with the outcomes of various government policies. The opening sentence in his introduction is revealing: "For someone whose focus is wild areas and farmlands, I'm still getting used to the urban environment, and how to manage the environment in an urban context". If someone with the skills and experience of Carl Binning is still "getting used to the urban context", then no wonder government policies designed to address the issue have yet to take a solid form. We need, as Ian Lowe (2001) argued in the final paper in the NCC forum, a vision, and he referred to an internet aphorism that goes: "We are not passengers on spaceship Earth, we are the crew". Lowe concluded that, "We're the crew because our technology gives us a broader range

of options than we've ever had for meeting our material needs without damaging natural systems". We agree and identify that elements of that technology are evident in the range of chapters in this book on urban wildlife, from Banks' (2004) PVA model for bandicoots to options for genetic and veterinary analyses of ibis mentioned by Ross (2004) and the growing atlases of wildlife sightings that enabled Kavanagh (2004) to provide such a detailed overview of the owls of Sydney.

In his book *The Birth of Sydney*, Flannery (1999) considered that "The changes wrought on the wildlife of Sydney by the First Fleet were profound". He looked at the matter with the eyes of a trained mammalogist: "The *gnar-ruck*, as the Eora knew the white-footed rabbit-rat (*Conilurus albipes*), was illustrated by a First Fleet artist, who noted that this delightful rodent was a considerable pest to the colony's storehouses. Sadly, the illustration is the first and last evidence that this now extinct creature ever inhabited the Sydney region". Flannery also commented that a surprising diversity of marsupials survived in the area that is now Sydney until quite late, but that Sydney's birds tell a different story. Their nadir came in the nineteenth century, when virtually every man carried a gun. In a closing comment, Flannery observed that, "The large-scale ebbs and flows of species, however, do not tell the entire tale of Sydney's birds, for local events are also having a profound impact. Of prime importance is the intensifying density of development that is depriving many suburbs of their native vegetation". Flannery here is taking on the role of the ecological historian, looking at changes in population sizes, comparing them against dates, and seeking causes in changes in the environment from guns to development and habitat loss. It is this kind of knowledge that will be an indispensable part of any program for conserving urban wildlife.

## Greening the cities

One can plant native vegetation, but if it is to be a restoration project for wildlife it needs to incorporate habitat suitable for the target animal species. The floristic composition and the structural diversity of any revegetation project will determine the composition of the fauna that inhabits the vegetation as it grows. Both Recher's (2004) Kings Park story in Western Australia and Catterall's (2004) urban winners and losers in Brisbane give a neat ecological picture of the change over time in the composition of a bird community as the vegetation changes. There is a number of ecologists across Australia who are providing insights, new information and collectively contributing to an emerging sense that urban wildlife is a special case of Australia wildlife. The next stage will be to link some of these particular topics to specific disciplines. For example, botanist Paul Adam (2001, 2004) was the only presenter common to both the NCC and RZS 2001 forums, the common strand being his interest in conserving native vegetation and, more specifically, the ecological impact of current development policy on remnants of disappearing plant communities. Among the next links will be those forged between architect and ecologist.

NSW Government Architect Chris Johnson's (2003) *Greening Sydney* is set to be an influential guide for fellow architects and planners. With echoes of Flannery, Johnson writes, "This book is a wake-up call to consciously promote the cause of greening in the face of an increasingly denser built environment". Animals get a brief mention in his book in relation to Daniel Williams and the greening of western Sydney, and Johnson notes that "Planting casuarinas, according to Daniel, attracts cockatoos and by carefully planting particular species the noisy minors [*sic*], that currently have a stranglehold in the area, can be encouraged to move away". Catterall (2004) and Parsons and Major (2004) have a lot to say about noisy miners *Manorina melanocephala* that would enrich Johnson's understanding of why one would want to encourage this aggressive species to move away. We share Johnson's aim to green the city, but would shift the emphasis towards giving native animals an equal footing.

Where Johnson sees biodiversity as a major plus, we see it as a basic reason for attempting to green the landscape. The most awful scenario would be a successful greening program that turned Sydney green with native plants, but in combinations of species that drastically skewed the composition of fauna habitat, thereby encouraging some species to become pests and others to fade away. The dilemma then would be whether to remove some of the plants and replace them with a mix of species more akin to a structural and floristic composition that provided habitat and food for a wider range of animal species. In any long-term project, this effort must include all those creatures that Clark (2004), Hochuli *et al.* (2004), Hutchings (2004), Yerman and Ross (2004) and Emery and Emery (2004) acknowledge as basic to any restoration attempt, namely the other 99% of animals, the invertebrates (Ponder and Lunney 1999).

The links are growing among the disciplines. Turpin and Crawford (2004) gain a specific mention for their ground-breaking, or rather concrete-breaking, "restoring the waters" project. Johnson described it thus: "Turpin and Crawford developed an incredibly poetic artwork titled Memory Line...It formed a dramatic contrast to the straight hard line of the concrete channel that it occasionally crossed". This serves to illustrate how zoologists might meet and work with architects; it will be through a mutual appreciation of form, colour and context. Whether it is Recher (2004) in Perth, Catterall (2004) in Brisbane, Hutchings (2004) in Sydney or van der Ree (2004) in Melbourne, zoologists are all responding to the beauty of the animals that they are studying. Architects have the same sense but seem to need an intermediary, such as artists or botanists, to forge a working link. If such a link is made, then Chris Johnson might see first hand the exciting details of the green and golden bell frog *Litoria aurea* story that he found mentioned in Low's (2002) book. Pyke and White (1996, 1999) have carried out much of the original work on this frog at the Olympic site. Their work is detailed, and Johnson would enjoy reading their accounts. Also, if Johnson were to read Richards (2002) on the attempts to save the Royal Botanic Gardens from the Grey-headed

Flying-fox *Pteropus poliocephalus* he might not be so quick to accept such encampments as “yet another example of the new ecology”. Johnson also noted that the ibis have multiplied and are now “out of control”. In fact, Johnson need go no further than the chapter by Ross (2004) to have another opinion about ibis in Sydney and whether they are really best described by what he calls Tim Low’s “fascinating examples of the new nature”. The link here is to understand the connection between habitat change, including a program for greening Sydney, and the fluctuation in the numbers of animals in a population.

We need to recreate habitats in the city that not only sustain those animals that move great distances, such as those extraordinary owls studied by Kavanagh (2004) and the bats studied by Hoye and Spence (2004), but also the frogs and reptiles that depend on the remaining habitat patches described by White and Burgin (2004). We may even consider recreating habitat that would again carry a population of brush-tailed rock wallabies *Petrogale penicillata* that once occupied Middle Harbour in Sydney (Lunney *et al.* 1996). A breeding colony of these wallabies is now being established in the Blue Mountains as part of the recovery plan for this threatened species, and restored habitat in Sydney could offer one attempt to combine Lowe’s “new nature” with threatened species management as well as Johnson’s (2003) “Principles for improving harbour landscape outcomes”. In the long run, we as zoologists can envisage Johnson incorporating wildlife – animals – into his “Eight ways to green Sydney”. In return, zoologists could work to produce a guide with the structural clarity that gives Johnson’s book its great strength.

### Reality itself

A different view emerges from the pen of the English journalist Nicholson-Lord (1987) in his book *The Greening of the Cities*. In his chapter *The country comes to town*, he detected a countercurrent: “If people were deserting the cities in ever greater numbers from the 1960s, wildlife appeared to be moving in the opposite direction. Built-up areas, conventionally characterized as urban deserts, were discovered to be thronging with foxes, frogs, weasels and dormice”. Nicholson-Lord considered that in the 1970s urban ecology developed into a recognizably separate discipline. “Yet,” he continued, “this only mirrored a widening recognition not merely that nature had survived in cities but that it possessed its own intrinsic and distinctive value. It was not, in other words, a shoddy, second-best imitation of real countryside but *reality itself*, or at least a legitimate version of it”. The text makes only passing reference to wildlife to illustrate his points, but the importance of his message is in the conclusion cited. We would extend it slightly to say that the wildlife of Australian cities is a legitimate subject, not just as a pale version of rural Australia, or as a travesty of the fauna of our national parks and nature reserves. It is reality itself for our urban human population interested in nature conservation.

The rise of urban ecology as a discipline is new and has occurred within our working lifetime, but there is another more striking time dimension. Toynbee’s (1972) reflective essay noted that, “Man’s metropolitan environment is a very recent one, if we measure its age by the time-scale of man himself... *Homo sapiens* has been in existence for at least 200,000 years [but] man’s metropolitan environment hardly began to take shape till 150 years ago, so man has lived in this environment, up to now, for only an infinitesimal fraction of the total time that he has been in existence, so far, on this planet”. If that observation brought a smile to your face, Toynbee’s next remark may wipe it off: “However, it looks today as if life in a metropolitan environment may be man’s permanent destiny. It is hard to see how he can ever escape from this environment if the earth’s human population is going to double or treble in size within the next generation or two, as the demographers predict”. Three comments spring to mind when the implications of Toynbee’s remarks sink in: not only is most wildlife ill-adapted to city life, so too are humans; if we have to live in cities in perpetuity, then rendering them more like the wild, i.e. greening them, makes biological sense for both people and animals. To see how to live ecologically in cities makes even more sense if we include wildlife as part of that undertaking. To aid in that process, we look at how the various views expressed by the authors in this book can be integrated (Lunney and Burgin 2004).

Urban wildlife, and the way it is regarded, as Davies *et al.* (2004) point out, will need to become a benchmark for most of the next generation of policy makers on biodiversity conservation. It will be the “bells on cat’s collars” outlook, created for bird protection but ineffective for small lizards, that will remain the standard for conserving biodiversity in our urban landscape if a wildlife vision fades from our urban minds (Grayson and Calver 2004). Turpin and Crawford (2004) have provided a stunning introduction to what is possible in reshaping our future, in reinvigorating our minds and introducing a new vision for the restoration of urban wildlife habitats. Not only is their contribution visually compelling, but it was also inclusive of the local community. We were delighted to be able to use the photos of their work on the cover. It shows in one brilliant, colourful display that the human imagination and our sense of past and future beauty can provide a new pathway, a “memory line”, that provides the inspiration to reverse the catalogue of decay in our nation’s biodiversity. This is an urban-led recovery, and we look forward to a specific inclusion on the theme of urban wildlife in future State of the Environment reports. The many contributions in this book point the way to seeing how and where this can be achieved.

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(Note: the references in the body of the text with a 2004 date that do not appear below refer to the chapters in this book and can be found in the contents page.)

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