

Wildlife of urban environments:

Some thoughts on the surprisingly un-surprising New Zealand context

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Introduction

About 1000 plant and animal species are considered threatened in New Zealand (Department of Conservation (DoC) and Ministry for the Environment (MfE) 2000). New Zealand's Environment 2010 Strategy (Ministry for the Environment 1995) identifies "...protecting indigenous habitats and biological diversity..." first in a listing of environmental priorities for action. The priority objectives for biodiversity action in New Zealand incorporate specific mention of the urban environment, i.e., DoC and MfE (2000: 42) state under Objective 1.2, Sympathetic management – Integrate and use measures in the sustainable management of production lands and urban environments that are sympathetic to indigenous biodiversity. Action (b) under this objective is to:

Encourage and support the protection, maintenance and restoration of indigenous biodiversity in urban environments, recognising the importance of urban initiatives to enhance community awareness of, and involvement in, biodiversity conservation.

In this paper I aim to provide an overview of wildlife in the urban environment with an emphasis on the New Zealand context and then in particular on the Christchurch context. I then intend drawing some conclusions from this overview analysis and from these suggest some areas to which those interested in the biodiversity aspects of urban ecology might shift their attention.

I must attempt to establish my own philosophy on the nature of, and importance surrounding, wildlife in the city before beginning the paper proper. While my multi-generation roots lie in Europe I am nevertheless a fourth generation New Zealander. As such it is important to me that New Zealanders, by expression in their culture, education and on the sporting fields, and in their urban and rural environmental contexts, can express themselves as different and special. It is clear then, at least to me that it is far more special to express the best of our indigenous environment than it is to mimic what is already commonplace in Europe and England. We therefore need to reassert and re-establish our botanical (and wildlife) roots as part of growing into the nation of Aotearoa/New Zealand.

The New Zealand context

In the New Zealand context the most surprising adaptation to city life of invertebrates, reptiles, fish, birds and mammals is that, apart of course for wetlands, so few higher order indigenous wildlife have indeed adapted to city life. Nowhere is this more apparent than in Christchurch where most remnants of indigenous wildlife occur around or in rivers, estuaries and other wetlands. Contrast this situation with Europe, North America or Australia – in many cities on

all of these continents many indigenous wildlife species have adapted to, or otherwise somehow remained in, the urban environment. Unfortunately there is little hard data for New Zealand but the Australian situation is enlightening (Table 1). It appears unlikely that anything like the Australian situation exists for New Zealand, despite the fact that about 3% of the country's total land area is occupied by the urban environment (based on projections of MfE 1997 data).

Table 1. Number of species of conservation concern occurring in population growth areas. na = not available

Growth area	Plants no.	Invert. no.	Mammals no.	Birds no.	Reptiles no.	Fish no.
New South Wales	518	Not given	4	29	28	12
□ Greater Sydney	113	Not given	0	12	10	4
□ South-east	na	Not given	na	na	na	na
□ North coast	na	Not given	1	18	15	3
Victoria	815	Not given	6	30	12	10
□ Greater Melbourne	92	Not given	1	16	8	3
Queensland	1197	Not given	18	34	75	20
□ South-east	186	Not given	2	17	21	6
□ Cairns/Townsville	528	Not given	2	12	21	5
□ Rockhampton	29	Not given	1	7	16	5
South Australia	185	Not given	8	33	17	5
□ Great Adelaide	95	Not given	0	11	9	0
Western Australia	1372	Not given	20	33	33	23
□ Perth and the SW	582	Not given	5	17	7	3

Source: adapted from Yencken and Wilkinson (2000).

How can these contrasting situations be explained? In Australia and the other continents mentioned, the indigenous flora remains an important focus within the urban landscape, in parks, in industrial areas (in some places) and in suburban housing areas – this flora and the associated 'ecosystem processes' continue to support a wide variety of indigenous invertebrates, reptiles, birds and mammals. And, in many European cities there is a 'history' of design which continues to support many of these attributes (see for example the works of Bornkamm *et al.* 1980, Bradshaw *et al.* 1986). Consequently, in many of these contexts the ecological processes remain somewhat intact and thus support many indigenous wildlife species and communities.

In New Zealand the situation is mostly the opposite of the European, North American and Australian continental experience. Day (1995) recorded 15 bird species in a study of birds in Hamilton City gardens – all were common species and most were exotic. Exotics, both flora and especially fauna dominate New Zealand's urban parks and reserves – key ecosystem cycles and processes have broken down and consequently we have a very poor representation of indigenous wildlife. The global market place, especially of flora and vertebrate fauna has been very detrimental to small island nations like New Zealand.

So, what is there we can talk proudly about in New Zealand? Clearly there is wildlife in New Zealand urban environments. Indigenous wildlife, especially birds but also fish and invertebrates, is especially abundant in coastal wetlands and this is apparent in Christchurch (Avon-Heathcote Estuary) and Auckland (Manukau and

Waitemata harbours). A substantial proportion of the national species' lists of birds occurs from the vicinity of these wetlands, but this tends to mask the rather depauperate extent of indigenous wildlife in non-wetland areas. In Wellington, Auckland and Dunedin there are numerous areas of native bush on ridgelines or in gullies and these support numerous invertebrate species and a reasonable birdlife. The flat cities like most of Christchurch, Napier and Palmerston North do not, in the main, have these natural advantages. However, Riccarton Bush in Christchurch supports a small range of mostly common native bird species but a large mostly native Lepidoptera (moths and butterflies) fauna (260 species recorded there) (Muir *et al.* 1995) – the last geckos though, may have disappeared c.20 years ago (Parkes 1995). As 'recently' as from 1914-26 Iram Gardens (about 1km west of Riccarton Bush) contained many native species no longer found in Christchurch, e.g., long-tailed cuckoo, tui and morepork, and other natives now found mainly in the hill suburbs and nearby forested reserves, e.g., bellbird and tomtit (O'Donnell 1995).

What we can learn from what remains

We can learn from what remains, particularly in terms of invertebrates and some bird and reptile species. Small remnants of native bush, even grossly modified and if reasonably appropriately managed (e.g., by allowing the build up of litter), support indigenous invertebrates (R. Emberson, Entomologist, Lincoln University, pers. comm. 2000) and some native birdlife. Unfortunately, these remnants are also extremely vulnerable – cities are often the first port of call for new invaders, pets such as cats take a terrible toll on birdlife, and fire (especially for single isolated remnants like Riccarton Bush in Christchurch) is a major hazard. Mörtberg and Wallentinus (2000) determined that forest area is the overwhelming determining variable for indigenous forest bird presence in Stockholm, and Collinge (1996) concluded there are no substitutes for large ecologically important core areas for the preservation of biodiversity. Day (1995) showed that total bird numbers in Hamilton gardens were significantly correlated to the proportion of native plants in gardens, but not to total plant biomass. Moreover in winter, the predominantly insectivorous native bird fauna requires evergreen garden plants for their food supply. Urban practitioners in New Zealand must take on board these lessons.

Restoration ecology can play a major role here. Some exotic flora can help indigenous bird species, e.g., holly trees in Christchurch are a seasonal food supply for kereru. However, we need to think about how to extend the network and size and quality of native remnants. Other authors, e.g., Meurk and Dakers (this volume) present some of the planning and design requirements to put these lessons into action.

Some redesign ideas for key non-park components of the urban environment – challenges for planners, businesses and educators

Mostly what I have talked about so far applies in the parkland-type settings: council parks units should be able to deal with issues here. But, what about the built environment, especially suburban residential areas and their associated places of learning, business and retail centres, and industrial areas?

Residential areas

Inappropriate infill housing leads to loss of tall trees (roosting and nesting places) and increases the density of hard ground cover (loss of invertebrate habitat, etc). On the other hand the trend for home gardens to use more native plants is encouraging for both invertebrates and birdlife. There is also a trend for more home composting. Compost mounds are rich sources of biodiversity and food supplies for birdlife. However, recent research (Emberson pers. comm.) indicates the diversity of native invertebrates such as beetles is low in compost areas.

Schools

Some schools, mostly those with a river boundary, are involved in the Water Watch programme (Jonet Ward, Lincoln University, pers. comm. 2000). This programme incorporates learning-by-doing and develops a connection with matters of natural environmental concern. A few schools have edible gardens and some compost their own waste. Most schools have a few native plants and some have more substantial native gardens.

The potential is enormous to vary Water Watch into an over arching and more proactive Nature Watch programme involving all schools. Such a programme could incorporate:

- An appropriate native vegetation plot containing sufficient botanical diversity to allow for natural processes of regeneration and to provide opportunities for long-term research by students at the school, e.g., invertebrate and bird monitoring, micro-climate variation, seedling establishment, etc. Such plots could also incorporate the growth of cultural crops such as harakeke (flax) which can be used for other purposes.
- School composting - after all if businesses can operate Cleaner Production programmes then so should schools. Composting can also be used for research purposes and the compost made can be incorporated within an edible garden.
- Development of an edible garden which utilises the school's own compost. Once again this garden fulfils a research function but also a social function in providing fresh fruit and vegetables to children or externally.

A major challenge will be to put into operation the Biodiversity Strategy (DoC/MfE 2000) within the curriculum framework and then to convince schools of the numerous benefits which would accrue from such commitments. Resourcing will therefore be an issue although commercial sponsorship, support from councils (consistent with objective 1.2 of the Biodiversity Strategy) and support from the Department of Conservation should all be expected and forthcoming.

The Central Business District

Business and retail centres continue to be poor providers of all sorts of wildlife habitat. While common birds such as scavenging gulls (*Larus* spp.) frequent the 'squares', little has been done in New Zealand to promote further indigenous biodiversity in these areas. Easily replicable examples such as the McCaskill Garden at Lincoln University provide the sort of model that could be used in such settings.

Industrial areas

Industrial areas have much potential and already, by default or neglect mostly, some habitat exists which is used by wildlife. Land beside railway lines provides habitat for invertebrates and lizards as do undeveloped or remnant industrial sites (in Europe and Australia these areas are major biodiversity refuges) – the common New Zealand problem is that many of these areas are occupied and over-run by exotic plant species. Some premises have also been landscaped but in very few instances do these provide for much more than exotic plant species and very common introduced bird species or very common native species (e.g., silvereyes, fantails).

Interestingly, many businesses are embracing concepts such as Cleaner Production, Environmental Management Systems and The Natural Step. 'Radical' considerations include the need to 'offset' carbon emissions by the planting of plantation forests. Landcare Research New Zealand Ltd is considering the use of native vegetation for this purpose. I have surveyed the sites of several other companies involved in formal environmental management programmes. Mostly these companies are making excellent progress in reducing pollution, minimising waste and improving energy efficiency. However, none of the companies examined had any obvious commitment to restoring native vegetation, in a meaningful way around their factory or retail outlets. Is this lack of commitment to indigenous biodiversity because it is not perceived to be a problem for businesses to worry about, because we are ashamed of it, or because it should be left out in the country where it belongs?

Conclusions

If urban environments in New Zealand are to be internationally distinctive then indigenous biodiversity must be embraced. Indeed, such an embrace will be a signal that New Zealand has finally grown up and that our gardens and urban environments generally no longer need to be a mirror image of 'ye olde' England. To make this progress will require commitment from educators, planners, ecologists and politicians. It will then be consistent with our international treaty obligations and with our growth as a nation that is proud of its indigenous natural heritage.

Finally, and to put the challenge that faces us into context, we need to examine a quote from Edgar Stead (1927), one of New Zealand's most famous 20th Century ornithologists (and a resident of Ilam, Christchurch):

To a large section of the general public the most interesting question in regard to our native birds is not which of them will survive in inaccessible parts of the back country, but which of them will be commonly met with in the cultivated, and even suburban areas.

Stead thought a wide variety of species would survive and maybe even prosper – mostly he was wrong. Our challenge, if we are to revive Stead's challenges, is to combine our growing ecological knowledge with our engineering and planning practice, and to political will, to create an urban paradigm which favours an

indigenous design and planning distinctiveness in the face of a global tide of biodiversity uniformity.

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