

## Birdscaping the suburbs — the Australian ‘birds in backyards’ programme and its potential for use in Wellington

### Eric Dorfman<sup>1</sup>

Principal Regional Scientist

Central Regional Office, Department of Conservation, PO Box 12-416, Wellington, New Zealand

### Kate Ravich

Program Development Officer, Birds in Backyards Program

Birds Australia, PO Box 1322, Crows Nest 1585, Australia

kuindah@bigpond.com

### Annabel Riley

Parks and Forests, Greater Wellington Regional Council, PO Box 11-646, Wellington, New Zealand

### ABSTRACT

Although Sydney is an urban centre of four million people, there are many green places where, despite substantial loss of biodiversity, some bird species still thrive. Residential gardens in Sydney are therefore important repositories for small passerines (perching birds) that spill over from these areas in search of food and new nest sites. Birds Australia, the country’s primary bird conservation organisation, has initiated a programme to enhance avian diversity in urban Sydney by boosting the utility of private residences and schools as bird habitat. Streams of this programme include primary research on habitat requirements and distribution of urban birds, education, planting initiatives, and information available on the Birds Australia website (<http://www.birdsaustralia.com.au/>). The research component of this programme adds substantially to the steadily growing body of knowledge about what brings wildlife into gardens.

Translating these results to a New Zealand city is useful because it encourages us to think about generalities in rehabilitating urban bird communities. In many parts of New Zealand, much of the native avifauna has disappeared outside reserves. Thus, offshore and mainland islands are critical in conserving the birdlife of New Zealand and, as in Sydney, birds move into suburban areas looking for additional resources. Habitat quality greatly influences the relative success of these birds and, as such, people’s taste in garden design has direct implications for conservation. We use as an example the suburbs surrounding Karori Wildlife Sanctuary in Wellington, where residential gardens are expected to provide important resources. Many residents, however, are resistant to the traditional ‘bush garden’ typically associated with provision of bird habitat and alternatives are necessary if gardens are to be useful for native fauna.

In this paper, we consider basic requirements for birds, such as food, vertical complexity, water, and shelter from predators. We apply them to different garden styles, presenting a number of alternative designs and discussing the relative merits of each for supporting wildlife. A caveat is given, however, that no programme to enhance bird life in New Zealand can be effective without appropriate control of predators, including mustellids, rats, and cats.

Many of the World’s bird populations face continual threat. Globally, one in eight bird species face extinction in the next 100 years (BirdLife International 2000). Most of these threats stem from effects associated with high human populations. Thus, many of the species that currently thrive tolerate, or indeed depend on, centres of human habitation.

Sydney provides many examples of this. Silver gulls (*Larus novaehollandiae*) and Australian white ibis (*Threskiornis malucca*) collect food from the city’s rubbish tips. Cormorants (*Phalacrocorax* spp.), darters (*Anhinga melanogaster*) and white-faced herons (*Ardea novaehollandiae*) collect fish that live in park ponds or venture up storm drains at high tide. Eurasian coots (*Fulica atra*) and

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<sup>1</sup> Present address: Museum of New Zealand Te Papa Tongarewa, PO Box 467, Wellington, New Zealand, [ericd@tepapa.govt.nz](mailto:ericd@tepapa.govt.nz)

purple swamphens (*Porphyrio porphyrio*) eat aquatic vegetation out of metropolitan parks. The most significant features for perching birds (passerines) are, however, the residential gardens that are becoming increasingly able to support birds that eat fruit, nectar, and insects. Over the last 40 years, maturing of suburban gardens and continuing gentrification of the inner city has led to greater abundance and variety of spaces that are sufficiently similar to natural habitats to support bird life.

The Birds in Backyards program of Birds Australia (<http://www.birdsaustralia.com.au/>) is an initiative designed to capitalise on these improved resources by building the capacity of homeowners through community-based education. Behind the education is an ongoing research program asking the question 'What makes a good garden for a healthy diversity of birds in Sydney?' This research is being led by Birds Australia, with input from the University of Wollongong, Sydney University and the Australian Museum, and involves surveys of gardens and direct behavioural observations. Two surveys have been undertaken to date, but ultimately, these surveys will be undertaken biannually. Volunteers record the birds visiting their gardens for twenty minutes each day for seven days in October and April. Results from this study build on the considerable literature on urban conservation by addressing issues local to Sydney. These have largely to do with competition from noisy miners (*Manorina melanocephala*) and other large or aggressive species. This information feeds directly back into education materials. For Sydney, methods to attract birds to gardens include planting for food and shelter, planting locally sourced natives in a complex mix of types, avoiding fruits and flowers that attract large birds, keeping lawns small, avoiding the use of chemical pesticides, planting in patches instead of single plants, not providing food for aggressive carnivorous birds such as magpies and keeping soil in a condition to favour invertebrates.

This works well in much of Sydney because bird populations are still widespread, so any individual garden can potentially be repopulated comparatively quickly. In New Zealand,

however, avian biodiversity survives, to a great extent, under the aegis of managed reserves on offshore islands and protected areas ('mainland islands'), and all but the most common species are almost wholly dependent on them. Many species have been successfully translocated to sanctuaries in New Zealand, and the populations of most grow steadily. Eventually, some of these birds will leave the safety and predictability of the sanctuary in search of new food or nest sites. Birds from sanctuaries that are near human habitation will rely heavily on residential gardens and the nature of the resources they provide.

Karori Wildlife Sanctuary, in suburban Wellington, is one such mainland island, which is completely protected from predators and competitors, and in which the food resources are maximised by continual regeneration (Fig. 1). In the few years since its inception, native birds have proliferated. The avian community now has many passerines which are dependent on the safe and resource-rich environment. These birds are expected to emigrate from the sanctuary to the surrounding suburbs. Evidence of increases of some species such as tūī (*Prothemadera novaeseelandiae novaeseelandiae*) feeding in neighbouring gardens suggests that this is already the case.

Many of the issues in Sydney translate to the situation in the suburb of Karori. Landowners can modify their gardens to include more leaf litter, more food-producing local species, and large patches of resources. There already exist planning guides to assist them with this. However, these guides usually focus on making the garden as naturalistic as possible, and the aesthetics of the plan are left to the individual. Homeowners have a variety of tastes, and many of these diverge markedly from the 'bush' garden espoused by most wildlife-oriented planting guides. On the other hand, few garden design texts consider wildlife meaningfully. As a conceptual exercise, we present a garden design using the habitat requirements of ten species of bird as the basis of a landscaping brief. These birds are either already in Karori Wildlife Sanctuary, or have been proposed to be introduced.

They are: North Island saddleback (*Philesturnus carunculatus rufusater*), kākā (*Nestor meridionalis*; Fig. 2), red-crowned parakeet (or kākārīki; *Cyanoramphus novaeseelandiae*), stitchbird (or hihi; *Notiomystis cincta*), New Zealand pigeon (or kererū; *Hemiphaga novaeseelandiae novaeseelandiae*; Fig. 3), North Island robin (or toutouwai; *Petroica australis longipes*), New Zealand tomtit (or miromiro; *Petroica macrocephala*), whitehead (or pōpokatea; *Mohoua albicilla*), bellbird (or korimako; *Anthornis melanura*), and tūī (*Prosthemadera novaeseelandiae novaeseelandiae*; Fig. 4).

The species all, to varying degrees, use mature forest, and most are dependent on it (Table 1). The biological aspects of the brief (Table 2) were aimed at recreating these habitat conditions as far as possible. This part of the brief guided the design elements, within the constraints of the homeowner's needs.

The location of the site is about 2 km in a straight-line from the Sanctuary, on a likely dispersal route. It is a modest three-bedroom cedar house, typical of the surrounding residences. The site is located on the hills below Makara Peak adjacent to the top of Karori Park, which is a regenerating bush remnant. There are no surrounding trees and only a few shrubs in any of the houses in the area including, currently, the client's house (Fig. 5). The site is exposed to winds from both the north and south, and from the south-east and south-west. The underlying soil is rocky and mainly builder's base material.

The garden plan (Fig. 6) has been designed to deal with some of the needs of the current owner and inherent issues of the site. The owner wanted a low maintenance garden with sunny modern outdoor living areas out of the wind. She also wanted a simple clear design style that identified with the location. Some of the issues include — a lack of privacy and surrounding trees, high winds, tough growing conditions, house/section orientation to the sun and budgetary constraints. Amenities that needed to be included were a shed, clothes line and car space.

Native plants were an obvious choice for the site, as an adjacent bush remnant was close and provided an indication of which plants are able to cope with the difficult local conditions. Native bush would also provide a good year-round supply of fruiting and flowering species for birds, enhancing the attractiveness of the area at a larger scale. Another consideration was the risk from exotics escaping to the bush areas adding to the weed problem in the bush remnant.

The garden was broken into separate but linked spaces to create pockets of outdoor living with views to other spaces. The spaces varied from being enclosed with more tree canopy to quite open areas where the vegetation recedes and the sky opens up. A simple choice of hard materials includes small pebbles, large cement pavers and railway sleepers. In some areas natives are planted sparsely with the hard materials dominating; in others massed natives provide striking simplicity and the required plant density for birds.

From the street the entrance is enclosed and framed by kōwhai (*Sophora microphylla*) and a broadleaf hedge (*Griselinia littoralis*), providing vertical complexity and privacy, and opening to a small-pebbled courtyard for morning coffees. Beyond that is a small rock garden providing habitat for lizards that is to be viewed from the south facing windows with rewarewa (*Knightia excelsa*), providing a strong backdrop and abundant fruit in season. A water feature links the rock garden to the north-west corner. This corner provides a much needed courtyard space surrounded by densely planted cabbage trees (*Cordyline australis*) and flax (*Phormium* spp.) to again provide privacy, bird food but not shade. On the north side of the house is a series of small amenity areas that are screened off by corokia (*Corokia* spp.) and hebe (*Hebe* spp.) hedges. A view to a sculpture provides a vista to lengthen the line of sight. These and other plants were chosen to form a 'community' that provides fruit and flower throughout the year (Table 3). Neighbours are being encouraged to plant their gardens in a complementary way, especially along adjoining property lines, to create larger continuous patches.

The proof of the value of this exercise will be in the satisfaction of the homeowner, as well as the eventual birdlife the garden supports. Both of these will come with the maturity of the garden, still years away. This brief paper cannot do more than scratch the surface of this topic. Further work would include refining habitat requirements, exploration of different garden styles, and planting areas for shelter from predators. It is important to stress that effective planting in New Zealand to encourage birdlife must be accompanied by vigorous predator control. Even in urban areas, brush-tail possums (*Trichosurus vulpecula*), rats (*Rattus* spp.), and domestic and feral cats (*Felis catus*) will undo any progress made in terms of planting. A strong commitment must be made to extirpate pests by anyone serious about bringing birds back into the city. Notwithstanding the challenges, 'crossover' projects, such as this, linking

wildlife requirements with human use have benefits for education as well as conservation. With increasing pressure on biodiversity from human populations this type of work may be an important tool to conserving biodiversity into the future.

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**Table 1** Habitat requirements and diet of ten bird species present at Karori Wildlife Sanctuary, or those likely to be translocated there in the near future.

Species	Habitat	Diet
Tūī ( <i>Prosthemadera novaeseelandiae novaeseelandiae</i> )	Mixed dense podocarp-broadleaf, beech forest, canopy of hīnau ( <i>Elaeocarpus dentatus</i> ), pukatea ( <i>Laurelia novae-zelandiae</i> ) etc. Understorey of <i>Coprosma</i> with tall emergents.	Primarily nectar, fruit seasonally, insects, and occasional seeds and pollen. Mostly arboreal feeders.
Bellbird ( <i>Anthornis melanura</i> )	Diverse forest of mixed podocarp-hardwood, with dense subcanopy and shrub layer, including <i>Coprosma</i> and <i>Macropiper</i> and emergent trees. Also coastal broadleaf with complex understorey.	Insects, supplemented with nectar and fruit, varying seasonally. Females eat insects from tree trunks, and all eat from the canopy and subcanopy.
Whitehead ( <i>Mohoua albicilla</i> )	Forest and dense shrubland. Tall open native forest (kānuka, mānuka, tawa) with shrubby understorey and grassy ground cover. Exotic plantations.	Invertebrates, mainly insects of many types. Also fruit and seeds. Mostly arboreal feeders, but can feed on the forest floor.
New Zealand tomtit ( <i>Petroica macrocephala</i> )	Forests from lowland podocarp-broadleaf to high-altitude beech, including mature and regrowth. Sometimes in settled districts, but only rarely in suburbs or towns. Closed forest with emergent rimu, abundant epiphytes, dense subcanopy and shrub layer, open or sparse ground cover.	Invertebrates, mostly insects of many types, and occasionally fruit. Arboreal and at all levels of canopy, subcanopy, shrub layer and ground.
North Island robin ( <i>Petroica australis longipes</i> )	Native forest, sometimes tall scrub or introduced pine. Podocarp or beech, mixed hardwoods with diverse, complex understorey. Moist gullies, dense canopies, ground covers of fern and extensive leaf litter. Occasionally dry mānuka scrub forest.	Invertebrates, including cicadas, earthworms, stick insects, slugs, and snails. Also fruit. Terrestrial and arboreal feeders, mainly foraging close to the ground and hunting from a perch.
Kererū ( <i>Hemiphaga novaeseelandiae novaeseelandiae</i> )	Dense mixed podocarp-broadleaf forest, complex structure, tall emergent trees and well-developed shrub layer. Large tracts and remnant patches. Visit parks and gardens to feed.	Mainly ripe fruit, especially of a wide variety of native trees, also leaves, young shoots, flowers and buds.
Hihi ( <i>Notiomystis cincta</i> )	Dense native broadleaf evergreen temperate rainforests, mostly moist valleys or elsewhere where nectar is abundant. Can move between different forest types in response to local flowering and fruiting.	Fruit and nectar of a wide variety of species supplemented with terrestrial insects from the leaf litter.
Red-crowned parakeet ( <i>Cyanoramphus novaezelandiae</i> )	Wide variety of habitats. Dense rainforest, coastal forest, scrubland, forest edges, and modified areas.	Seeds, berries, fruits, buds, flowers and shoots of plants. Also small numbers of insects from the leaf litter. Require a ready supply of water.
Kākā ( <i>Nestor meridionalis</i> )	Canopy of unmodified indigenous temperate rainforest, broadleaf forests with many epiphytes and fern undergrowth, beech and mixed podocarp. Forage arboreally or terrestrially, in flowering, fruiting or seeding shrubs within forests, usually in the canopy or crowns of emergent trees. Will feed on flowering ornamental plants such as camellias. Can excavate sap and grubs from trees and logs.	Omnivorous. Seeds, fruits, flowers, leaves, nectar, insects and their larvae, and sap.
North Island saddleback ( <i>Philesturnus carunculatus rufusater</i> )	Old growth forest-kānuka scrub, pōhutukawa forest with open canopy, cliff vegetation. Forage in tufted crowns in the canopy from branches and twigs and on the ground in the leaf litter.	Mostly insects and their larvae, also fruit and occasionally nectar.

**Table 2** Biological considerations for the design brief.

Feature	Notes
Leaf litter	Areas of the garden which are not raked, but allowed to compost, creating mulch that supports invertebrates (worms, isopods, weta), forming the food for ground-foraging birds.
Vertical complexity	Tree canopy, mid-storey, understorey. Many birds use one part of the canopy to perch in (to avoid predators) and another to forage in. Birds will feel safer if there is a layering of heights in the vegetation.
Water	Placement of drinking water is best away from ground cover that might shelter predators.
Open spaces	Some species, such as swallows, like to forage over open grass or water. Interspersing open spaces in with closed areas will provide an attractive mix of foraging opportunities.
Fruiting/flowering trees throughout the year	The site will be more attractive to a bird if there is food all year round, especially for those birds that might learn about the location and make it part of their foraging rounds.
Shelter	Dense or spiny plants (which do not have to be in prominent positions) will protect birds physically and need to be in sufficient abundance to provide shelter for the birds that live there.
Patches	Beds of plants that provide food and shelter work better than individual plants. This is because passing birds might not notice a single plant, an even if they do, they will not stay, because the resource is not sufficient to attract and maintain individuals, pairs or flocks.
Density	Dense plantings are better for birds than sparse ones. However, it is possible to have non-traditional or minimalist spaces, against a dense but unobtrusive background, which would serve birds well and still maintain a modern aesthetic.
Scale	Think of working with neighbours. A 'bird's perspective' is useful. Many birds travel some distance and sample several more or less habitual areas.
Native versus exotic species	There are many reasons for growing natives. If they are locally sourced, they are already adapted to the local climate. They can be easier to propagate and local birds will recognise them as a resource. For those people who enjoy working with natives, it can be a rewarding experience. However, it is not necessary to use native species when focusing solely on birds. Many exotic species, such as banksia, grevillea, and protea provide abundant nectar, and local species can learn to use them. As long as they do not become environmental weeds, they can be usefully added to a garden that supports bird life.

### Section 3: Perspectives from Australia

**Table 3** Food plants used in the garden plan. FL = Flowering, FR = Fruiting.

Plant Species	Timing of Flowering or Fruiting											
	Spring			Summer			Autumn			Winter		
	Sep	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug
<i>Aristotelia serrata</i>		FL	FL	FL	FL	FR						
<i>Carpodetus serratus</i>				FL	FL		FR					
<i>Clematis paniculata</i>	FL	FL/ FR	FL/ FR	FL/ FR	FR							FL
<i>Coprosma grandifolia</i>					FR	FR	FR	FL/ FR	FL/ FR	FL		
<i>Coprosma lucida</i>			FL									
<i>Cordyline australis</i>			FL	FL		FR	FR	FR	FR			
<i>Griselinia littoralis</i>			FL	FL	FL/ FR	FL/ FR	FR	FR				
<i>Hebe stricta</i>					FL	FL	FL	FL	FL			
<i>Knightia excelsa</i>		FL	FL	FL								
<i>Lophomyrtus bullata</i>					FL	FL	FR	FR				
<i>Macropiper excelsum</i>						FR	FR	FR				
<i>Melicytus lanceolatus</i>		FL	FL	FL	FL	FR	FR	FR	FR	FR		
<i>Metrosideros fulgens</i>	FL						FL	FL	FL	FL	FL	FL
<i>Muehlenbeckia astonii</i>			FL	FL	FL/ FR	FL/ FR	FL/ FR	FL/ FR	FL/ FR			
<i>Parsonsia heterophylla</i>			FL	FL								
<i>Passiflora tetrandra</i>		FL	FL	FL	FL	FR	FR					
<i>Phormium spp.</i>			FL	FL	FL							
<i>Pittosporum tenuifolium</i>	FL	FL	FL									
<i>Pseudopanax arboreus</i>	FL/ FR		FR	FR	FR	FR	FR	FR	FR	FL	FL/ FR	FL
<i>Pseudopanax crassifolius</i>					FL/ FR	FL/ FR	FL/ FR	FL/ FR				
<i>Schefflera digitata</i>	FR				FL	FL/ FR	FL	FR	FR	FR	FR	FR
<i>Solanum spp.</i>	FL/ FR	FL	FL	FL	FL/ FR	FL/ FR	FL/ FR	FR	FR	FR	FR	FR
<i>Sophora microphylla</i>	FL	FL										
<b>TOTAL</b>	<b>7</b>	<b>8</b>	<b>14</b>	<b>13</b>	<b>15</b>	<b>14</b>	<b>15</b>	<b>13</b>	<b>9</b>	<b>6</b>	<b>4</b>	<b>5</b>



**Fig. 1** Predator-proof fence at Karori. (Photo: Karori Wildlife Sanctuary).



**Fig. 5** Site characteristics of area to be planted. (Photo: Annabel Riley).



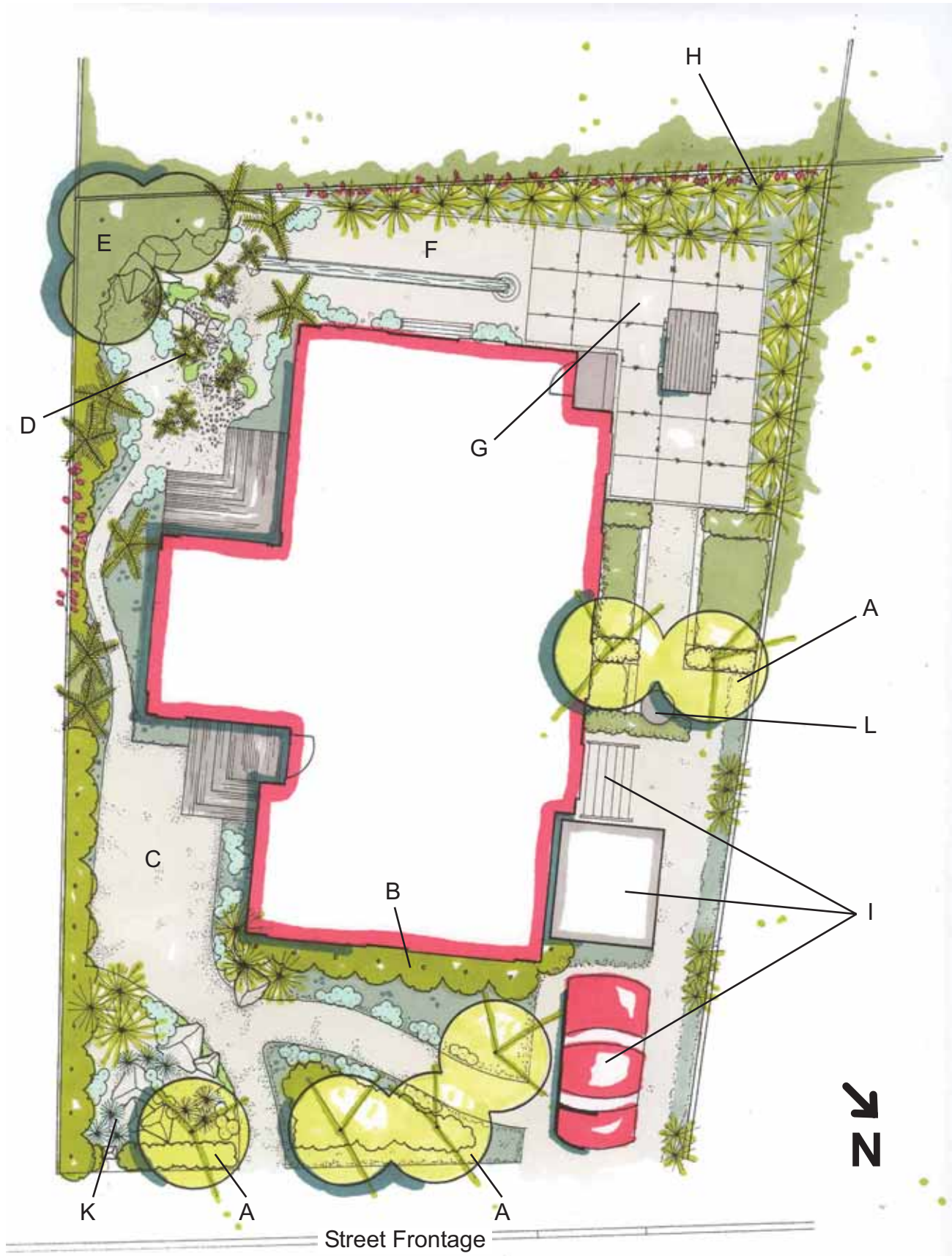
**Fig. 2** Kākā (*Nestor meridionalis*). (Photo: DOC).



**Fig. 3** New Zealand pigeon (or Kererū; *Hemiphaga novaeseelandiae novaeseelandiae*). (Photo: DOC).



**Fig. 4** Tūī (*Prosthemadera novaeseelandiae novaeseelandiae*). (Photo: DOC).



**Fig. 6** Landscape plan. **A**, kōwhai; **B**, *Griselinia littoralis*; **C**, pebbled courtyard; **D**, rock garden; **E**, rewarewa; **F**, water feature; **G**, paved courtyard; **H**, cabbage trees and flax; **I**, amenities; **J**, *Corokia* hedge; **K**, *Aciphylla* / *Scleranthus* / *Hebe* / *Libertia grandiflora* rockery; **L**, sculpture.