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Urban Habitat Guidelines

FOR THE ACT

Life in the SUBURBS

Urban Habitat Guidelines for the ACT
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Further Information
For more information on the Life in the Suburbs project including technical reports for the Lower Sullivans Creek Catchment Ecological Survey (LSCCES), weblinks, resources and future events see
www.lifeinthesuburbs.net.au

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Foreword

While cities occupy relative little space compared to other land uses such as agriculture, their impact on the immediate and surrounding landscape and its inhabitants is extensive, often reaching far beyond the borders of our suburbs. As city dwellers, we have a responsibility to understand the nature of this impact, and how our actions as individuals and communities can be moderated to influence its direction.

One need only look to current nation-wide water shortages to understand the value of managing natural resources as a community. However, while the Canberra community has been proactive in implementing strategies to manage our precious water resources, urban habitats and the ecosystem services they provide are being lost or eroded, typically because their value to human as well as wildlife communities is underestimated.

This document is a guide to understanding the importance of urban habitat and the many ways in which the Canberra community can make a difference in maintaining and enhancing the rich diversity of life that characterises and sustains our city.

It aims to increase awareness of threats to urban habitat and biodiversity, and provides practical tips to help manage these threats, as well as guidelines for those wishing to undertake landscape or gardening projects with a view to enhancing habitat for native species.

Developing a greater understanding of the values of urban biodiversity among government, planning and community sectors is key to the development of a value framework for inclusion in planning processes and landscape design within our public parks and open spaces, as well as private gardens.

This document provides a platform for discussion on perhaps the most interesting challenge for urban settlements in striving toward a sustainable future: urban biodiversity.

Warwick Williams
Director
Facilities and Services
The Australian National University

Part 1. Urban biodiversity - a community asset

Cities | a shared habitat

Our cities are home to thousands of species, of which humans are but one. Everyday, perhaps without knowing, we interact with many of these species. We do so because we share our habitat, the urban landscape.

As the species for which cities are built, humans exert the major influence over these landscapes. Our city centres and suburbs, our parks and our water bodies are all tailored to meet the needs of our community, providing for our commerce, education and recreation, as well as our housing.

The extent of our influence over urban landscapes means that we also determine the availability and suitability of habitat for other species. From nature reserves to the manicured parks, residential gardens and commercial centres, each land use within a city provides opportunities for some species and not for others. The species we include or exclude from urban landscapes may play an important role in the ability of cities to provide livable habitat for both human and non-human residents into the future.

Cities are living systems. They rely on nature to provide the clean air, water and fertile soil that all living things need to survive.

Approximately half of the world's population now lives in cities (Pearce 2006). In Australia, over 90% of people live in urban areas (Pyper 2004). The ability of cities and the surrounding landscape to sustain this growth will depend on our ability to build and maintain cities and communities that balance our commercial, social and environmental needs. Achieving this balance, however, presents a major challenge.

As cities expand to accommodate new housing, roads, industrial and commercial estates, increased pressure is placed on the surrounding bushland and urban 'greenspace'. These areas play host to our urban 'biodiversity'. They provide wildlife habitat and are the foundation of important landscape processes, including natural drainage and the processing of pollutants.

Whilst scientific research can, and will, continue to provide a greater understanding of how urban biodiversity contributes to both landscape and human health, increasing awareness of its value to human communities is essential if we are to ensure it achieves and maintains appropriate focus in the planning of our cities (Platt et al 1994; Barnes and Adams 1999).

"…the most destructive aspect of most modern cities is the profound schism they create between human beings and nature." (David Suzuki, Earth Time, 1998)

As city dwellers we must become aware of our impact on the environment, both as individuals and as communities. Only in doing so can we ensure the health of the landscapes that support our community.

Ecosystems | their role in our survival

Ecosystems are made up of groups of plants, animals, other living organisms (such as bacteria and fungi), and their physical and chemical environment including the soil, air and water.

We rely on ecosystems to provide not only our immediate physical needs, such as food and water, but also to provide the conditions necessary for our survival, such as a livable climate, clean air and fertile soil. Ecosystems provide these and other services of value to humans. Collectively these services are known as *ecosystem services*.

"Ecosystem services are the planet's life support system, and our lives, indeed all life, would be impossible without them." (Chivian 2003)

Understanding the role of ecosystems and preserving and maintaining their function in both urban and rural environments is important, because despite advances in technology, we still have limited ability to replicate their function (Cork 2001). In some cases, services such as water purification can be achieved more effectively and at a lower cost by natural or restored landscapes than by technological alternatives (Chivian 2003).

Ecosystem Services | what are they?

Provision of Clean Air
Air pollution can impact on the health of humans, other animals and plants.

Plants produce the oxygen we need to breathe and remove harmful pollutants from the air, including greenhouse gases.

Greenhouse gases have been identified as the main contributor to the global warming phenomenon that is thought to be disrupting world climate patterns. Our cities and our agriculture have been planned around relatively stable climate patterns and rely on them to support our communities, crops and livestock.

Provision of Clean Water
All life on earth needs water to survive. The quality of water needed by each species, however, differs greatly. Humans need water of a relatively high quality to avoid illness from water-borne diseases. For this reason, we build expensive water treatment plants and test water quality routinely to make sure it is suitable to drink and cook with, as well as bathe in.

Ecosystems filter, recycle and store water.

Vegetated landscapes (whether forest, lawn or garden) allow water to seep into the soil, where it is filtered naturally as it drains to nearby water storage bodies, including dams, lakes and rivers. Within these ecosystems, aquatic plants, animals and micro organisms that can tolerate poor water quality play an active role in removing and binding nutrients and toxins, providing cleaner water for use by humans, other animals and plants (Chivian 2003).

Recycling of Organic Waste
Plants and animals (particularly microbes and invertebrates) play an important role in breaking down (composting) organic waste. From the kitchen compost to the poo of our pets, they turn potentially harmful products into harmless and useful ones, such as mulch and fertiliser.

When we use composted mulch on our garden (and when natural leaf and bark litter are left to compost on the ground), it helps to improve the structure of the soil and the ability of water, nutrients and oxygen to reach the root systems of plants. As a result, plants experience healthier and stronger growth.

Greater absorption of water into the soil also reduces runoff, which can carry soil (the reason the stormwater appears muddy after rain) and un-composted organic matter (including pet poo!) into our waterways.

When large amounts of organic waste make its way into our waterways, the water can become harmful to humans and animals that swim in or drink it.

Even out flood and drought
Flood and drought are part of our natural climate cycle in Australia, however, the impact of both can be greater where changes in the landscape impact on the ability of ecosystems to perform their services.

For example, as concrete, roads and paving replace garden, park and bushland, less water is able to seep into the soil and this water is forced across land to stormwater drains. When it rains, water in the drains rises rapidly and can be a flood and safety risk to properties and residents down stream. The leaves of trees and shrubs intercept (catch) water, allowing it to drip slowly to the ground, giving it more time to seep into the soil. The roots of trees, shrubs and deep-rooted grasses also provide pathways for water to enter the soil, and hold the soil together, reducing erosion.

Control of pest species
Where landscapes provide habitat for both a species and its predators, there is a reduced likelihood of a pest species emerging: natural predation will tend to control the populations.

Blue-tongue Lizard

While they may steal your dog's food, they will also help keep less desirable pests out of your garden, and may even become a regular feature of your suburb.

VRU, CSIRO © 2005

Pollination and seed dispersal
Insects, birds, mammals and reptiles play an important role in the pollination (fertilisation) of flowers, and in the transport of seed to new locations. These roles underpin cultivation of many of the fruit and seed crops we depend on for food, as well as allowing native plants to spread and replace themselves.

Human health and wellbeing
Whether we yearn for a trip to the coast or a weekend picnic with family, indulge in a walk or cycle around the lake, enjoy a spot of fishing or simply admire the sounds of birds as we eat lunch, we benefit both physically and mentally from the natural environment. Landscapes that include natural features such as plants, water and animals are the foundation of many of our cultural and recreational activities, as well as our spiritual beliefs.

Ecosystems provide everything we need to survive and to enjoy a high quality of life.

VRU, CSIRO © 2004 | 2005

Biodiversity | the key to maintaining ecosystem services

A large variety of living species and the interactions between them are involved in maintaining ecosystem services. Biodiversity is the term used to describe this variety.

When we lose a species, we lose the role or roles they play in providing ecosystem services. As more species are lost, the ability of those remaining to provide these services is lessened. When *too many* components are lost, or a *key species* is lost, the ecosystem service may no longer be provided.

Think of an ecosystem as a car, the service it provides being transport. The loss of one part, like a fuel cap might make the car run less efficiently, but it will still get you from A to B. A flat tyre might mean it takes you longer to get from A to B and the wheel suffers some damage in the process. The loss of the fuel tank as a key component however, would mean that the car could no longer provide the service of transportation, even though it may still look like a car.

'Urban' biodiversity looks at how biodiversity contributes to human and landscape health by supporting ecosystem services in cities.

Greenspace | at the heart of the issue

Greenspace (also known as open space) is the area of land *within* an urban settlement that is not built upon. It includes nature reserves, original and planted vegetation, river corridors, nature strips, parks and sporting grounds as well as individual trees, residential gardens and vacant land (Smith et al 2005). Greenspace includes both native and introduced species.

Greenspace is an important community asset, because it provides habitat for the many species that form the foundation of urban ecosystems.

Where natural landscapes surrounding the city are under threat, whether due to natural causes, such as drought or fire, or human pressures such as land clearing, greenspace can play an important role in providing temporary refuge and food resources for wildlife. In the immediate period following a large-scale disturbance such as fire, the availability of urban habitat may mean the difference between death and survival for many species.

Canberra suburbs | refuge in a time of need

The Yellow-tailed Black Cockatoo (*Calyptorhynchus funereus*) is moderately common in and around the Canberra region, and typically inhabits native eucalypt forests and pine plantations where major food sources include seed and wood-boring insects. The species makes seasonal migration into lowland woodlands and city suburbs where food sources are available during autumn and winter.

In January 2003, much of the primary habitat of the Yellow-tailed Black Cockatoo was lost in the bushfires that burned through 66% of the Territory's land (160 000 ha), including large tracts of pine plantation, nature reserve and national park. The Garden Bird Survey (GBS) managed by the Canberra Ornithological Group (COG) documented a mass dispersal of surviving birds to our suburbs, with the abundance of the Yellow-tailed Black Cockatoo increasing by over 1500% when compared with the average of previous years.

Although this species does not predominantly inhabit urban areas, during times of hardship (such as bushfire, drought and winter) their survival can depend on suitable urban habitats in the region.

Helen Fallow © 2006

A Yellow-tailed Black Cockatoo feeding in the urban area

Pam Rooney © 2002 | VRU, CSIRO © 2006

Part 2. Managing urban biodiversity

Objective

The growth of agriculture and forestry in rural areas surrounding the ACT, and the growth of the city of Canberra and its suburbs have seen large areas of natural habitat replaced with human modified landscapes. As a result, much of the habitat that once characterised the region has been lost, diminished in quality or reduced in area, and remaining patches have become isolated from each other. These changes in the landscape have placed significant pressure on natural ecosystems and the biodiversity that supports them. In some cases changes are of a scale that threatens the existence of entire ecosystems and the services they provide.

In the ACT, two natural ecosystems are threatened: lowland woodland and lowland native grassland. If these ecosystems, their species, and the roles they play in maintaining healthy landscapes are to be maintained, the pressures that urban development and human settlement impose on them must to be addressed.

Urban biodiversity management aims to complement the role of non-urban landscapes in providing wildlife habitat and ecosystem services, while meeting the needs of the human population.

Principles

The following principles provide a guide to managing and enhancing urban biodiversity using basic conservation concepts. The principles target different types of greenspace, from nature reserves to backyard gardens, and highlight the role that human behaviour can play in protecting urban ecosystems by managing threats to biodiversity, wildlife and habitat.

Principle 1. Maintain large areas of natural vegetation to provide stable habitat for a large variety of local species

Large areas of natural to semi-natural wildlife habitat, such as nature reserves, national parks and private reserves provide *sources* of biodiversity. Being near to natural condition, these areas and the ecosystem services they provide play a key role in providing ecosystem services. They provide the main source of food and shelter for a large proportion of the wildlife that inhabit and visit cities and their suburbs, as well as species that are unable to survive in the urban landscape.

The size of source habitat is important because many of the species that occupy these areas are not able to survive in the small and often patchy habitat characteristic of urban settlements. These species survive only where habitat is large enough to support breeding and to provide protection from human induced impacts, such as competition from garden weeds and pest species, predation by domestic pets and the dangers presented by roads. Many of the species that occur in source habitat may never be seen in urban environments because they cannot survive these threats, or because they are unable to use urban food resources and habitat.

The Brown Treecreeper | in need of space

The Brown Treecreeper (*Climacteris picumnus*) was a common feature of the lowland woodland and open forest ecosystems that were once common at lower elevations within the ACT.

In the last 10 years, however, it has all but disappeared from habitats less than 300 hectares in area, and has been declared vulnerable to extinction in the ACT.

Why habitats larger than 300 hectares?

Females leave the territory where they were born, *whether or not suitable habitat is available*. As a result of human induced pressures such as predation by cats and foxes and habitat replacement, the areas where it is able to survive are now limited.

Small populations of the Brown Treecreeper are restricted to habitat along the Lower Naas River, Goorooyarroo, the Clear Range, Burbong, Majura Field Firing Range and Newline Quarry.

Helen Fallow © 2006

Other species that frequent our cities also depend on source habitat. They may venture into our gardens and parks, and some may even nest or grow in the urban environment, however, as a population they need source habitats to supply a major part of their diet and to provide breeding partners and/or breeding sites. Without source habitats these species would not survive. Studies show that small birds and small ground-dwelling mammals in particular, are rare or absent in suburban areas and bushland patches smaller than 10 hectares. If these species are to survive,

Useful Resources

To learn how the ACT is taking steps to protect the Brown Treecreeper and other threatened species and ecological communities in the ACT http://www.tams.act.gov.au/live/environment/native_plants_and_animals/threatened_species_and_ecological_communities_in_the_act

'Hands on for Habitat' is a joint initiative of the Australian Government and Cadbury aimed at enhancing awareness of the issues facing threatened species among primary school students. To access to a free Teacher's Resource Kit and information on the annual awards programme http://www.environment.gov.au/biodiversity/threatened/ts-day/habitat.html

source habitats must be maintained, because even the best efforts of suburban gardeners and city planners are unable to provide adequate habitat (Catterall 2004).

The main threats to source habitat are:

- greenfield development (where urban development takes place in areas of natural habitat such as grassland and lowland woodland),
- predation by domestic pets particularly cats, but also dogs. Cats and dogs that enter source habitat can have a large impact on native wildlife, particularly ground dwelling species such as lizards and small native birds,
- pest animals (such as the Common Myna bird, Foxes and Rabbits). Pest animals are a threat because they eat native species, compete for resources such food and nesting sites, or chase other species from their habitat. Some native animals such as Currawongs, though not 'declared' pest species, are also a threat to source habitat as their numbers have increased as a result of landscape changes and they behave in similar ways to pest animals,
- pest plants, including garden plants that invade bushland and replace native habitat.

Maintaining source habitat and protecting it from human induced threats such as introduced weeds is key to ensuring the survival of many regional species such as the Brown Treecreeper and the Hooded Robin that are at risk of extinction, as well as threatened ecosystems.

Remnant species and source habitat cannot be simply replaced by new plantings. The complexity and age of these habitats gives them value far greater than habitats created by humans. (Lindenmayer et al 2003)

Principle 2. Maintain and create wildlife 'corridors' and 'stepping stones' to allow species to move through the city and suburbs

Wildlife 'corridors' are connected patches of vegetation that provide links between source habitats and allow for the movement and spread of species between habitats.

Street plantings with native tree species play a key role both in attracting bird species and in facilitating their movement through our suburbs.

Whilst they may support small populations of some species, corridors are often narrow or small in area (leaving resident species susceptible to urban threats), and typically do not provide enough habitat resources (food, water, shelter and breeding opportunities) to support large and diverse wildlife populations in the absence of source habitats. Such habitats are known as *sinks* of biodiversity.

'Stepping-stones' are small patches of habitat that are scattered throughout the landscape. Stepping-stones can include road islands, residential gardens and parks within apartment complexes, as well as individual trees. Typically too small to provide permanent habitat for many species, stepping-stones are important because they provide habitat for smaller species such as insects, skinks and microbes (think of the size of the average compost bin and the diversity of life it supports!). Patches with tall trees also provide vantage points for birds, allowing them to survey the landscape for food and water resources, and to keep a look out for predators.

Greenspace | a source of local seed

Urban plantings of native grassland species can help ensure that these species remain a feature of the landscape, particularly where they are rare or belong to a threatened ecosystem. These plants can provide a source of seed that can be harvested for future plantings. Such plantings have an added bonus, being native to the area they are less likely to cause harm if their seed makes its way to local nature reserves.

As long as stepping stones are not too far from each other and other habitats, such as corridors and reserves, they can provide steps for more mobile species such as birds and flying insects to *hop* from one site to another, providing food, shelter and sometimes water along the way.

Corridors and stepping-stones provide important sites for nutrient recycling, as well as permeable surfaces that contribute to natural drainage, water filtration and water flows.

Principle 3. Design greenspace to co-accommodate ecosystem services and human needs

No matter how well planned, greenspace cannot replace or replicate the habitat, biodiversity or ecosystem services provided by large areas of natural vegetation, particularly source habitat. Greenspace can, however, play a role in supporting efforts to enhance and protect biodiversity and maintain ecosystem services by providing:

- **buffers** between suburban or industrial development and important habitat. Buffers help protect native species from

the negative impacts of urbanization, including predation by domestic cats, competition from more aggressive species and accidents with cars,
- a high diversity of **natural and artificial habitats** that can support a diversity of plants, and animals ranging from insects, frogs and reptiles to birds and mammals,
- sources of **food** that can help local and regional species survive during periods of flood and drought or in the aftermath of fire,
- permanent **water** in times of drought,
- **corridors** of habitat that allow species, including migratory birds to travel through the city and between source habitats within and around the city,
- sources of **local seed**,
- sites for **nutrient recycling,**
- sites for water to seep into the soil and be filtered naturally, thus maintaining **natural water flows,** and
- habitat for plants that **remove pollutants** from the air and water.

When designing greenspace the attributes of each individual site should be considered to take advantage of opportunities to maintain or incorporate habitat or ecosystem services.

A well designed network of greenspace should complement human use including recreation, relaxation, backyard food production and movement (pedestrian and cyclist) as well as supporting functional needs such as the transport of stormwater and the production of ecosystem services.

Factors to consider in designing greenspace include:

1. The role of existing landscape features such as trees, vegetation structure or wet areas in:
   - meeting human needs, such as shade, cover or food production,
   - providing habitat and ecosystem services, and
   - attracting or discouraging pest species - such as the Common Myna.

2. The proximity of the site to other urban habitats - such as corridors, stepping stones and source habitat and opportunities to link to or complement these.

3. The ability of introduced features, for example, drainage lines or constructed urban wetlands, to provide ecosystem services such as the recycling of nutrients as well as providing habitat.

4. The proximity of housing and the likely impact of domestic pets on wildlife that may be attracted to the finished landscape.

5. Human safety:

   Some large eucalypt trees can be prone to dropping branches. The position of pedestrian and cycle paths as well as picnic tables and seating areas should be considered carefully to reduce safety concerns and to avoid removing existing habitat unnecessarily.

   Habitat features likely to attract snakes should likewise be sited to maximise public safety.

6. Appropriate signage or community education:

   Urban landscape features aimed at enhancing habitat, biodiversity or ecosystem services, should be accompanied by appropriate signage and/or education programs to ensure community understanding of the role of the landscape and the values it contains for the wider community. Miscomprehension of landscape features can lead to poor community stewardship and potential vandalism where the site is perceived to impact negatively on the community.

The David Street Wetland, located behind O'Connor shops provides habitat for a diversity of local wildlife including birds, turtles, yabbies and frogs. It also provides a valuable recreational resource. Urban wetlands can also play a role in improving water quality by providing sites where stormwater can be filtered naturally before being returned to the stormwater system.

Tim Raupach © 2006

Tim Raupach © 2006

Useful Resources

Lawrence, I. & Breen, P. 1998. "Design guidelines: Stormwater pollution control ponds and wetlands". Cooperative Research Centre for Freshwater Ecology, Canberra.

Principle 4. Manage the impact of environmental weeds

Environmental weeds (also known as invasive plants) are species that have a negative impact on, or have the potential to impact negatively on the environment. These species must be managed to minimise the damage they cause to landscapes and ecosystems.

The impact of environmental weeds is a serious problem across Australia because these species have the ability to cause widespread damage to natural, urban and agricultural landscapes, as well as freshwater and marine ecosystems.

Species, whether introduced or native, become environmental weeds when their ability to replace native species (or preferred garden or agricultural species) is widespread, often covering large areas of land or entire landscapes. This usually occurs because:

- they grow faster than natural or preferred species, allowing them to shade out and replace these species,
- they reproduce quickly allowing them to spread rapidly across large areas, and
- the diseases, parasites and animals that control the species in its natural habitat are absent.

Controlling environmental weeds is a community responsibility.

An environmental weed allowed to grow in a suburban backyard has similar destructive potential as the same weed growing in native bushland, or in an agricultural landscape. This is because it has the same potential to spread and cause widespread damage.

If weed species are to be controlled, widespread effort is needed. This effort must include all urban landscapes, from suburban gardens to schools and churchyards as well as nature reserves.

Weeds | the growing cost to our community

In 2006-07, the Territory Government and community groups spent $1.67 million on controlling weed species in the ACT (ACT State of the Environment Report 2007). Nationally, where agriculture and industries such as fishing and tourism are affected by weeds, lost production, the cost of repairing damage to infrastructure (eg irrigation channels) and the cost of controlling weed populations has the potential to run into the billions of dollars.

Pyracantha | a garden escapee invading bushland near you

Planted as a garden ornamental and often as a hedge, Pyracantha species, also known as Firethorns, are a weed in the ACT, eastern Victoria, NSW and southeast Queensland.

Firethorns produce large quantities of fruit, which are favoured by some native bird species, including the Currawong. Because the seed of the fruit is not digested, it can be carried long distances by birds before being deposited in other habitats including nature reserves and bushland where it:

- invades bushland, private and public land by forming thick stands that shade out other plants and restrict public access
- encourages large numbers of some bird species including Currawongs that can become pests in urban areas and that prey on less common bird species
- provides winter habitat for fruitfly.

To prevent the spread of Pyracantha in the ACT, plants in suburban gardens, as well as bushland invaders need to be removed and disposed of carefully.

Useful Resources

For information and pictures of bushland weeds of the ACT, follow the links to the brochure "Are your garden plants going bush?"
http://www.tams.act.gov.au/live/environment/pestsandweeds/managingpests

For a list of Weeds of National Significance and info on how to manage them
http://www.weeds.gov.au/

Molonglo Catchment Group has excellent information for the ACT region at http://www.molonglocatchment.com.au/Weeds/

Principle 5. Manage the impact of environmental pests

Environmental pests are animals that have a negative impact on the environment, usually by threatening the survival of native plants or animals. In some cases the means of environmental impact is through the spread of disease and parasites.

Pest animals cause serious damage to ecosystems and agriculture, as well as human livelihood and health.

Animals become pests because;

- they lack predators, parasites or diseases which limited their numbers in natural conditions - either the predators have been removed (e.g. Dingoes), or in the case of introduced species their natural controls may not occur in Australia,
- they have high intrinsic population growth rates, e.g. mouse-sized animals are more likely to become pests than elephant-sized ones because they breed frequently, have short pregnancies and multiple births. Similarly, animals that give birth to multiple young are more likely to become pests than those that have only a single young at a time.
- they are ecological generalists (enabling them to use and survive in a large number of environment types) or are able to live in disturbed environments, such as near cities or farms, e.g. introduced European Starlings are generalists that have become pests on many continents,
- changes in the landscape, such as clearing, provide ideal conditions for their population to grow and spread rapidly,
- they out-compete local species for resources such as food and nesting sites,
- they eat native species, and
- they cause damage to plants and or human buildings – such as termites.

Most pest animals of urban areas are introduced from foreign countries, with many originally brought to Australia as pets.

Where the impact of pest species can be reduced using safe, environmentally acceptable and humane methods, this needs to be done to protect local wildlife.

Whilst it can be difficult for members of the community to become actively involved in the management of existing pest species, communities can play a key role in ensuring that new pest species are prevented from establishing.

The Red-eared Slider Turtle and the Ferret are examples of pets kept in Canberra with high potential to become new pests within the greater region of the Murray Darling Basin (MDB) and southern highlands respectively. Control efforts against these species have so far been successful, and there are currently no wild populations of either, however the ferret has twice re-emerged. Control efforts for other escaped pets such as the Oriental Weatherloach, a fish species, have not been successful and the fish is now unfortunately found throughout the MDB.

Common Myna | introduced pest

The Common (formerly Indian) Myna bird is an example of an introduced pest. The Myna aggressively competes for nesting hollows with native bird and mammal species. The impact of the Common Myna on biodiversity is significant as nesting hollows are in limited supply, both in rural and urban landscapes. The species is currently the subject of research and community programs aimed at reducing local populations. There has been some success reducing populations of the bird in the ACT (see link below).

Useful Resources

For information on pest species of the ACT
http://www.tams.act.gov.au/live/environment/pestsandweeds

For information on the Common (Indian) Myna bird and efforts to control the species in the ACT
http://fennerschool-associated.anu.edu.au/myna/index.html or www.indianmynaaction.org.au

For a description of the Red-eared Slider Turtle
http://www.tams.actgov.au/live/environment/pestsandweeds/redearedsliderturtle

Noisy Miner | native species can also become pests

The Noisy Miner, often confused with the introduced Common Myna, has become a problem in urban areas because it aggressively chases other birds from its territory. So aggressive is the species that most other birds and some tree dwelling mammals are chased from areas they inhabit. Insect pests, such as lerps, thrive in this relatively bird free environment.

Because families of miners usually stay in one location, they need habitat where food is available year round. Urban backyards featuring showy nectar producing flower species such as Grevilleas and Eucalyptus species provide this in abundance.

Managing this native species may be as simple as providing habitat for smaller bird species to protect them from the miner. Studies indicate that gardens containing a dense and diverse variety of native plants of different growth forms (grasses, shrubs, herbs, vines and trees) may be less attractive to miners as well as providing habitat and shelter for smaller bird species. Spiky shrubs may also provide shelter for small birds from domestic and feral cats.

Tim Raupach © 2006

Community members should report any unusual exotic species (e.g. Red-eared Slider Turtle or wild-living Ferrets), and under no circumstances release pet species into the wild. There is **no penalty for handing in illegal species**, such as Red-eared Slider Turtles, and no excuse for keeping them. Illegal pets or sitings of unusual exotic species should be reported to the Vertebrate Pest Coordinator (see below).

The community has a key role to play in preventing pets becoming pests.

There are a number animal shelters and re-homing services operating in the ACT to assist owners find new homes for pets they can no longer care for or keep. Unwanted pets should be advertised with these services, or taken to the RSPCA. If no suitable home can be found, unwanted pets should be euthanased by a veterinarian rather than released into the wild, no matter how harmless they seem.

Pet ownership is a long-term responsibility. Species, adult size and life expectancy of pets should be carefully considered, as should owner lifestyle, to avoid the need to re-home pets.

Native species can also become pests. In the ACT, for example, urban gardens and the increased warmth of the city have provided ideal conditions for many large native bird species, including the Noisy Miner and Pied Currawong, resulting in a rapid increase in their numbers. Eastern Grey Kangaroos are also recognised as pest species on sheep properties in the region.

In the backyard garden, things can work on a much smaller scale. One pest exists here in abundance, and most households at one time or another have tried to control its numbers …the humble snail. Unfortunately, the most common method of control, snail bait, can have an unseen impact on native wildlife - it is lethal to the Blue-tongue Lizard (*Tiliqua scincoides*). Blue-tongues consume large quantities of both snails and slugs, so if these have ingested bait, the Blue-tongue consumes the bait also. The largest member of the skink family, the Blue-tongue is a harmless species. It is not venomous and will only bite if harassed. As testament to their placid nature, they can even be kept as pets. A common visitor to ACT gardens, there is a chance your garden plays host to a Blue-tongue Lizard. If you see them in your neighbourhood or you live close to a nature reserve, please **refrain from using snail bait.**

Principle 6. Manage human impact on urban biodiversity and ecosystem services

We all have an impact on the landscape. Understanding the nature of our impact can help to prevent further loss of biodiversity and help build sustainable cities.

We can each play a key role in maintaining and protecting biodiversity and ecosystem function by following simple steps to reduce our impact on both natural and urban landscapes.

Useful Resources

To report illegal pets or sightings of unusual exotic species, contact the Vertebrate Pest Coordinator, Territory and Municipal Services, ACT Government on 6207 2135

To re-home a pet or to adopt an unwanted pet http://www.petrescue.com.au

To provide a temporary home for an unwanted pet or to adopt one from an animal shelter http://www.fosterdogs.org/

For information on keeping reptiles as pets in the ACT http://www.amonline.net.au/factSheets/reptiles_pets.htm

Urban Stewardship | 10 steps promoting biodiversity

1. **Do not take anything** (plants, rocks, soil or dead wood) **from nature reserves or bush land**.

   Live plants, logs, fallen branches, bark and rocks (both small and large) provide habitat for many animals including frogs, reptiles, small mammals and invertebrates, and should not be removed from any park, reserve or bushland without a licence.

Native habitat | leave it where it lay

In the ACT, anyone caught removing any of this material without a licence can be fined up to $10000. These offences can also attract a one year jail sentence.

Tim Raupach © 2006

Cigarettes | toxic litter

Cigarette butts make up 50% of litter in Australia! (PlantArk 2006.)

Cigarette butts are designed to absorb toxins and cancer causing chemicals from tobacco smoke. As they break down, they leach these toxins into our soil and waterways where they can damage the health of plants and animals, just as inhaling the smoke can damage the health of humans.

In addition to their impact on the chemical environment, it is estimated that discarded cigarette butts cause over 4000 fires in Australia annually. Fires have the potential to cause major damage to both human and natural communities.

Help protect biodiversity, keep your butt out of the environment!

Beth Mitchell © 2006

2. **Dispose of rubbish, recyclable and organic waste thoughtfully.**

   Plastic bags, chip packets and the plastic rings from milk bottles may look harmless, but they can choke or suffocate animals. Other litter such as cigarette butts and aerosol cans leach toxic chemicals into our waterways and harm plants and animals. This rubbish belongs in the bin unless it can be recycled.

   Organic waste left behind in the schoolyard, on the street or in the local park can make its way into the stormwater system and eventually into our lakes and rivers.

   A build up of organic waste in water bodies can cause environmental problems including sedimentation (a build up of decomposed organic matter, which can obstruct waterways) and increased nutrient levels in the water. When water becomes overloaded with nutrients, oxygen levels in the water become depleted. Aquatic plants and animals need oxygen to survive and can die if oxygen levels fall below a certain level. Water bodies overloaded with nutrients are also at greater risk of algal blooms, which can be toxic to humans and animals alike.

Organic waste such as autumn leaves and dog poo can be major contributors to the nutrient and sediment levels in urban creeks and lakes.

We can help reduce the amount of organic waste making its way into our waterways or ending up in landfill:

- don't remove fallen leaves from garden beds unless you have to, most break down quickly and they can suppress weeds, aid in retaining soil moisture, improve soil structure and provide conditions favourable for soil organisms,
- take large amounts of organic garden waste such as autumn leaves and garden clippings to the green waste section of local waste and recycling centres, where it will be composted and resold as garden mulch,
- start a home, school or workplace compost for food scraps and garden or office waste (including shredded paper),
- start a worm farm to process you cat or dog poo. Very few parasites or harmful bacteria can survive being digested by worms, but if you are concerned only use the castings and liquid fertiliser on non food producing plants such as lawn,
- put organic waste (including dog poo) in the bin when you are out and about.

Useful Resources

For information on cigarette littering in Australian and how communities can help
http://www.planetark.com.au/campaignspage.cfm/newsid/137/story.htm

To find our more about Canberra based recycling and waste management programs
http://www.tams.act.gov.au/live/Recycling_and_Waste

Cats | to roam or not to roam

Studies show that cats contained indoors or in specially built cat runs can live an average of 12-15 years, while free roaming cats (even those kept in at night) live on average less than 3 years (Stewart 1997).

Cats that roam outdoors are at higher risk of catching serious illnesses such as feline AIDS and of picking up worms and parasites that can infect wildlife, other cats and potentially humans. One such parasite is *Toxoplasma gondii*. Spread by cat poo, the parasite can cause blindness, abortion, breathing and digestive problems, and potentially result in a chronic infection causing death. Free roaming cats are also at risk from collisions with cars, fights with other cats and dogs, snakebites and in some cases human cruelty.

Tim Raupach © 2006

Studies undertaken in Canberra indicate that domestic cats prey on around 480,000 animals in the urban environment each year!

3. Be responsible for your pets and their impact on the environment.

- Do not let dogs or cats roam free as both kill native wildlife. Hunting is an instinct for both cats and dogs; do not be lured into the belief that your pet does not hunt.

- Consider a cat enclosure for your cat.

Keeping your cat in at night can protect some native species, mostly those active at night, however it will not protect a great many other species that are active during the day. Outdoor cat runs or enclosures can provide cats with access to the outdoors as well as providing a high level of protection for wildlife.
In the ACT, two new suburbs in Gungahlin, Forde and Bonner and the adjacent Mulligans Flat and Goorooyarroo Nature Reserves have been declared **Cat Curfew Areas.** Predation by cats in these areas could have a huge impact on native wildlife, including ground feeding and nesting birds such as the Brown Treecreeper and the Hooded Robin, both of which are vulnerable to extinction in the ACT.

Within Cat Curfew Areas, cat owners must keep cats indoors or in cat runs 24 hours a day.

Tim Raupach © 2006

- Do not allow your dog to go off leash in nature reserves and other on-leash areas; there are reasons that dogs are not allowed off leash in these areas. The quick dash your dog makes into the bushes could see the demise of a native reptile, frog or mammal. If that reptile is a venomous snake, the outcome could be reversed.

- Pick up pet poo. Specially made bag holders are available from most pet stores. These attach to your dog's leash, making them hard to leave behind when you set off with your K9 companion. A similar product, designed for nappies, can be purchased from the baby section of major supermarkets.

Useful Resources

Stewart, R (1997). EnviroCat. A new approach to caring for your cat & protecting wildlife. Hyland Publishing House, Melbourne.

For ACT Cat and Dog laws contact Territory and Municipal Services http://www.tams.act.gov.au/live/pets/dgctfactsht

Cat enclosures | a safe haven for cats and wildlife

Cat enclosures provide a safe and entertaining environment for your cat and have been shown to have no negative impact on cat welfare. Cat enclosures typically feature an outdoor fully enclosed area with access to the home, allowing cats to roam freely between the two spaces. By ensuring the cat cannot roam to hunt, enclosures also provide a high level of protection for local wildlife.

The RSPCA and the Cat Protection Society provide information on cat enclosures and can provide advice on suitable design and local stockists. The RSPCA in Weston display a modular 'Cat Park' designed by Catnip, which adheres to all animal welfare guidelines.

The Catnip Modular Cat Park system consists of one or more modules joined by tunnels and connected to indoors via a pet door. The modular construction of Catnip Parks provides for flexibility of design, and with a little imagination, the sky is the limit! The Parks can run along walls, under bushes and verandahs, around trees and up into their branches. Designs are available to suit all building types, from owned homes to rental properties to courtyards and balconies.

Images courtesy of Balcony Courtyard Living Pty Ltd (Canberra)

4. Report injured wildlife.

As a result of the many hazards presented by the urban landscape, wildlife can become trapped or injured and can require the help of experts to remove or care for them.

Handling trapped or injured wildlife is often best left to qualified handlers to minimise injury to both humans and wildlife.

In the ACT Urban Wildlife Rangers are employed to rescue injured or orphaned native animals, and also to remove animals such as snakes and possums that have become trapped or have taken up residence in houses.

To contact an ACT Urban Wildlife Ranger
Call Southside 6207 2127 (business hours)
Call Northside 6207 1679 (business hours)
Call Canberra Connect 13 22 81 (after hours).

RSPCA Wildlife is also licensed to care for wildlife in the ACT. Their primary role is to nurse injured animals back to health, with native animals being released on recovery. The RSPCA can provide advice on how to prevent an injured animal suffering stress and further injury, and determine whether it is best for you to take the animal to the shelter or whether a wildlife officer should be sent to retrieve the patient.

Call 6287 8113 (business hours – wildlife officer)
Call 0413 495 031 (after hours – volunteer carers)

In areas surrounding the ACT, the NSW Wildlife Information and Rescue Service (WIRES) and Wildcare Queanbeyan provide similar services.

WIRES 13000 (1300 094 737)
Wildcare Queanbeyan 6299 1966 (24 hour service)

Useful Resources

Balcony Courtyard Living supply Modular Cat Parks to the Canberra region http://www.balcourt.com.au/

There are also many guides on the web that detail how to build your own cat run, with flat packs also available by order across Australia.

5. Do not feed or encourage stray cats.

Feeding stray cats will not prevent them from eating native species; it will only encourage them into your backyard and allow them to support larger breeding populations.

Stray cats can carry diseases and parasites that can be harmful to domestic cats, wildlife and humans alike.

To make your yard less attractive to stray and neighbourhood cats, rats and other vermin:

- cover compost bins
- do not put meat scraps or bones in compost bins
- do not leave uneaten pet food (cat or dog) outside over night
- cover sandpits to prevent them from being used for toileting.

6. Do not plant or propagate environmental weeds.

Know which species are declared environmental weeds in the ACT and learn how to identify them. (see 'Useful Resources', below) This will help to avoid unwittingly planting or propagating these species, and allow you to identify garden plants that you suspect to be environmental weeds. In the ACT, garden centres carrying a 'Bush Friendly' sign have agreed not to stock known environmental weeds.

7. Remove or manage environmental weeds on your property.

Suburban gardeners, landowners and land managers can all contribute to the management of environmental weeds by following three easy steps:

- remove weeds from home gardens or managed lands (preferably before they set seed),
- encourage friends, family and neighbours to remove weed species,
- dispose of weeds in a responsible manner
  - cover your trailer when taking weeds to the greenwaste section of the tip, this will help prevent seed being spread to other areas,
  - bag seed heads if you cannot take them to the tip soon after removing, and
  - take care when composting weeds. Some weeds can grow from pieces of stem or branch and for this reason need to be composted at high temperatures to prevent the weeds from sprouting. Likewise killing seed can require high temperatures.

8. Be active in maintaining natural habitats in and around our city.

By volunteering or supporting environmental groups and programs that act to restore, monitor and maintain both natural and urban habitats, urban communities can make a positive contribution to urban biodiversity now and into the future.

A list of ACT environmental groups and their activities can be found at www.lifeinthesuburbs.net.au under Resources and Links.

9. Ride a bicycle or walk to work or school.

Not only is this a great way to stay fit and save money on fuel, it can help reduce the level of harmful greenhouse gases in the environment. It can also help to reduce accidents with wildlife and relieve pressure on governments to build new roads, which can impact on wildlife habitat and nature reserves.

VRU, CSIRO © 2006

10. Provide habitat that includes natural food sources such as nectar and fruits rather than providing artificial food.

Providing artificial food (including seed, meat, dog or cat food or other food scraps) can reduce the diversity of birds visiting your garden by encouraging only particular species or pest species that may chase off other birds. Leaving food scraps or compost bins open can also encourage rats and stray cats.

It is difficult to meet the dietary needs of birds with artificial food, so avoid becoming a fast food joint and look into planting bird-attracting shrubs, grasses and trees. Visiting birds may also become dependant on food provided and be unable to survive once you move or stop providing food.

Useful Resources

For information and pictures of bushland weeds of the ACT, follow the links to the brochure "Are your garden plants going bush?" http://www.tams.act.gov.au/live/environment/pestsandweeds/managingpests

Molonglo Catchment Group has local information about weeds: www.molonglocatchment.com.au/Weeds

Weed Swap is an initiative run by the Australian Native Plant Society to encourage the community to remove environmental weeds from their garden. The Weed Swap is held twice a year in spring and autumn and offers free plants for removed weeds. http://nativeplants-canberra.asn.au/weedswap.htm

For information on cycling in the ACT http://www.pedalpower.org.au

Part 3. Planning urban habitat

Keep project aims simple

Be realistic about what can be achieved within your budget and the space you have set aside. You do not need a lot of money or space to contribute to urban biodiversity and ecosystem services; a simple compost bin or worm farm, for example, will keep organic waste out of landfill, as well as providing habitat for many insects, microbes and worms. You will also gain a free source of nutrients for your vegetable patch, rose garden or native plant garden.

Avoid unrealistic expectations by keeping project aims simple.

A landscape project designed to promote natural drainage, for example, may include native grasses and small shrubs aimed at encouraging small native bird species. Earthworks designed to catch water and allow it to seep into the soil, such as swales, may work perfectly well, however, the landscape may fail to attract target bird species if:

- located next to houses where cats roam during the day and or night,
- exposed to too much competition from other species including larger birds,
- there is no nearby habitat from where small birds can come to the site, and
- the site experiences high visitation from humans and dogs that scare wildlife from the site.

Invertebrates | all-round recyclers

Invertebrates are animals lacking a spine, including all insect species. The ecosystem services they provide underpin both rural and urban ecosystems. They pollinate our native plants, fruit trees and vegetables, allowing fruit to grow and seeds to set for the following season or for our consumption; they provide food for a large diversity of species including birds, reptiles, mammals and fish; and they process the wastes of plants, animals and humans. Invertebrates are the street sweepers of the animal kingdom.

With over 90,000 tonnes of garden waste deposited annually in Canberra tips and 45,000 tonnes of kitchen waste collected from garbage bins, invertebrates play a much needed role in breaking down the wastes of human settlements. Their continual processing of rotting plant and animal matter slowly turns the waste of humans, plants and other animals into the soil that supports our gardens and urban landscapes. Aquatic invertebrates provide the same service in water, making them all-rounders in the waste-recycling department.

While plant selection can help manage some of these issues, for example plants with prickly leaves may deter cats and provide bird refuge, it cannot address the basic limitations of the site. Planning your project may require a level of flexibility, as the process can reveal assets and limitations that may impact on your original design.

Patience is required when developing habitat as it takes time for plants to grow to a sufficient height and structure to provide habitat.

Potential simple projects could include:

- Removing weed species. This may involve removing and replacing a single Privet tree or Cotoneaster, or a larger project such as removing an Ivy vine or Pyracantha hedge.

Luke Mitchell © 2006

Removing environmental weeds makes a contribution to weed management in the local area, and helps protect regional biodiversity.

- Native nature strip. Nature strips are commonly planted to lawn, which depending on the species can need a lot of water and maintenance to remain healthy year round. Native grasses and or small flowering plants such as native daisies typically need less water once established and do not need to be mown (though there are native grasses that can be) potentially saving you money as well as valuable recreation time.

Do not plant shrubs or small trees close to the edge of the road as they can obstruct the view of traffic.

Under the *Roads and Public Places Act* (1937), you may be required to remove any plant seen to provide a traffic hazard or obstruct pedestrian access.

- A frog pond and or frog refuge (where rocks, logs and native grasses allow frogs to seek refuge during dry periods, and where water pools temporarily after rain).

It is illegal to collect frogs or tadpoles from public land. The basic rule of attracting frogs to your garden is "if you build it they will come"!

Useful Resources

Flora for Fauna provides information on native species that attract wildlife and includes useful information on planning and planting a habitat garden. The site also includes useful resources for teachers http://www.floraforfauna.com/

'Creating a Frog Friendly Habitat in the ACT Community' provides detailed information on design and plant species as well as links to other sites on frog species and their habitat. Click on the 'Habitat guidelines' link at http://www.lifeinthesuburbs.net.au

For tips on creating a waterwise garden and to find requirements and regulations for installing rainwater tanks http://www.thinkwater.act.gov.au/more_information/publications.shtml#factsheets

The Gould Group shop provides a wide range of educational and instructional guides on creating sustainable communities, with resources for gardeners, teachers and school students http://www.gould.edu.au/shop/

- A bird haven targeting certain types of birds, for example small birds or birds not seen often, but known to occur in your area.

Pam Rooney © 2002

Landscapes that include plants of varying height and structure (such as trees, shrubs, small flower plants and tussock grasses) may limit the attractiveness of your garden to pest species such as the Noisy Miner, and may encourage less common species such as small birds.

- A butterfly garden using species known to attract local butterflies.

- A water wise garden designed to 'catch' rainwater on site, and allow it to drain into the soil. Such a garden may also feature native or non invasive ornamental species that require lower levels of water to maintain, particularly throughout the summer.

Things to consider;

Many websites and garden centres that promote wildlife friendly gardening tend to profile or market plant species that attract the more common species of wildlife such as honey-eaters, parrots and some butterflies. To attract less common visitors to your urban landscape, such as small native birds, a little more research may be required. This research will be well worth it because small birds typically find little habitat in urban environments.

Some landscaping activities require the approval local authorities such as the ACT Planning and Land Authority. Approval is typically needed where there is a need to protect natural assets or to protect community wellbeing.

Possums in the roof

Many people warm to the idea of attracting wildlife into our suburbs, however, few enjoy the 'patter' of little possum feet at 3am in the morning.

The Common Brushtail Possum, unlike many mammal species, fares well in suburban Canberra. Their ability to use a diversity of food sources, adapt to different types of shelter and fend off cats, makes them the most abundant native mammal species to share our city. This ability to adapt, however, often results in the species being considered a pest when they share our homes.

A protected species under the *Nature Conservation Act (1980),* the Common Brushtail Possum (*Trichosurus vulpecula*) resort to living in the dark corners of our rooves and garages due to the limited availability of the natural tree hollows that are its home of choice in the wild.

While it may be desirable to remove possums from your roof or garage, having the possum relocated may not be the answer. Possums are extremely territorial and when relocated often die of stress or fall prey to other possums, other territorial species or traffic.

Several steps can be taken to encourage possums out of your roof, while still allowing them to share your block.

1. Create an alternative habitat

The simplest alternate habitat for a possum is a nest box. These can be purchased online from the Gould Group or from the RSPCA. Alternatively there are many websites and books available to help you construct your own.

Creating an alternative habitat for possums in your area has many benefits. Firstly, the possum will not try to gain entry to your roof if it is happy and comfortable in its new home. Secondly, providing a home for one possum in your garden, will deter other possums in the neighbourhood from taking up residence in your yard.

2. Block access to the roof

- locate where the possum is gaining access. Possums are extremely acrobatic and can squeeze through areas as small as 9cm in diameter, so pay attention to all areas where light enters the roof cavity during the day,
- observe the possum leaving the roof and block exits - timber or chicken wire can both be effective if firmly secured. Keep in mind that possums are nocturnal, which means they leave their nest to forage for food on nightfall and return in the early morning,
- if the possum is reluctant to vacate, encouragement can be provided by lighting the roof space for a few days or by sprinkling camphor or naphthalene in the roof cavity around likely entry points. Alternatively, after blocking off all other exits you can install a one-way flap, allowing the possum to leave but not re-enter, and
- trim branches that overhang your roof to prevent possums from attempting to reach the space (this is a wise fire safety measure also).

Useful Resources

Birds Australia has produced guidelines for Urban Bird Habitat: www.birdsinbackyards.net/spaces/guidelines.cfm

The Native Animal Network Association provides designs and instructions on constructing nest boxes to suit different possum species. http://www.nana.asn.au/n2-pbox.htm

"Living with possums" http://www.tams.act.gov.au/live/environment/wildlife/livingwithpossums

ACT Landkeepers | industry in action

Andy Stodulka of Design Construct Industries became involved with ACT LandKeepers out of a desire to preserve frog habitat on his industrial property in Hume. In 2005, Andy commissioned a local ecologist, Donna Hazell, to undertake a frog survey and habitat assessment of the site, which features two small natural wetland areas as well as a man made dam. The survey identified five local frog species and suggested the site could benefit from some enhancement plantings.

To implement the suggested enhancements, Andy contacted Greening Australia Capital Region to seek assistance through the ACT Landkeepers program.

Native tubestock were supplied and a small group of Greening Australia volunteers joined a GreenCorps team working out of the Australian National University for an afternoon of planting. The GreenCorps team also assisted Andy to erect a raised boardwalk from the car park to the site. Andy, his staff, and visitors to Design Construct Industries now have improved access to the site and a place to sit and listen to the frogs calling, and the frogs are protected from human traffic.

Thanks to Andy's interest in protecting the frog habitat on his property, this small but significant wetland site has been protected and will continue to provide a home for local frog species for many years.

A joint ACT Government and Greening Australia initiative, the ACT Landkeepers program supports community participation in restoring both urban and rural landscapes, providing scientific expertise and resource funding. ACT Landkeepers is jointly funded through the ACT and Australian Governments.

Existing natural wetland area

Greening Australia and Greencorps members enhancing the adjacent man made dam with native plantings

Know the role of existing species, habitats and landforms

Before you start, make sure that the habitat you intend to create will provide a positive outcome.

Our perception of what good quality habitat looks like can be very different from that of the species that may use the site.

This is not to say that landscapes that are pleasing to the human eye will not also have habitat value for wildlife, but rather that some landscapes, like those that exist at the fringe of our schools, parks and roads that appear unkempt and "in need of improvement" may already provide significant habitat for local wildlife, or contribute to ecosystem processes.

Identify the species that occur at the site

Identifying the plants that grow on the site can determine whether the site contains valuable habitat that can be built on, or weed species that need to be removed. There are many field guides available for both weed and native species. A list of field guides relevant to the ACT can be found at www.lifeinthesuburbs.net.au under Resources and Links.

Observing the birds, insects, reptiles and small mammals that use the site throughout the year, and listening for frogs after spring and autumn rain, will give you an idea of the animals that use the site and the value of individual plants and site features, such as wet areas or groups of plants.

Knowing what species occur at the site will help identify the type of habitat you might work toward.

For example, a site may include a number native grasses as well as introduced weeds, and may be visited by a number of butterflies throughout the year. By identifying environmental weeds, you can target these for removal and management (seed will undoubtedly be left in the ground and will need follow up removal). Learning which butterflies visit the site will allow you to identify the plants they are using and select appropriate species to fill the gaps left by removing the weeds. This information may also identify opportunities to diversify plantings to encourage larger populations of existing species or to attract additional species.

Know when to do nothing

In urban areas, pockets of native grassland, remnant (pre-European) trees and wildlife habitat can remain long after buildings and roads have replaced the majority of the original vegetation or usable habitat.

These patches can provide refuge and potentially food and breeding sites (such as tree hollows and wet areas) where these resources are otherwise rare. These sites are unlikely to occur in suburban backyards, however, other greenspace such as school and church grounds, road side verges, old industrial sites and public spaces may support remnants of original vegetation or regrowth from native seed stored in the soil.

If your site is located in an area likely to contain a remnant patch of vegetation, and your study of the site reveals mostly native species, the best course of action may be to simply remove and manage weed species and otherwise leave the site undisturbed.

Sites that have public access may also provide a valuable community education opportunity and with careful planning can be the focus of interpretive signage and/or viewing areas.

Useful Resources

For information about ACT Landkeepers, contact Greening Australia Capital Region on 6253 3035 or admin@actgreeningaustralia.org.au

The many values of trees | measuring up introduced species

A large deciduous tree that shades the western face of a building can help to reduce the build up of heat within the building during the summer months. When the tree drops its leaves in the winter months, winter sun will be allowed to penetrate, warming the building face and internal rooms. Trees that perform this role can provide gains in energy efficiency as well as providing pleasant areas for outdoor use.

Do not overlook introduced plants

In the ACT, greenspace, particularly in older suburbs, hosts established trees of varying age. Whether native or introduced, established trees provide habitat as well as ecosystem services, even at the backyard scale. As landscape features, established trees should be considered for their contribution to human enjoyment and comfort as well as their value to wildlife.

Removing large landscape features such as established trees can also dramatically change the microclimate (including shade, moisture levels and frost protection) of the site and have a negative impact on remaining species that rely on these conditions, including human residents.

Tree Protection

Large trees are a community asset as they provide shade, habitat and ecosystem services and also give a street its character. In the ACT many of the large street trees and other large trees in our suburbs are protected under the *Tree Protection Act 2005*. Trees protected under the act are classified as 'significant trees' and can be native or introduced.

Significant trees include all trees on ACT leased land that:

- are 12 metres or taller,
- have a trunk circumference of 1.5 metres or greater, at 1 metre from the ground (or combined circumference where more than one trunk is present), and
- have a canopy of 12 metres wide or greater.

Under the *Tree Protection Act 2005*, you cannot remove, damage or lop significant trees or undertake groundwork in the 'tree protection zone' - the ground and area beneath the canopy and 4 metres from the trunk, without written permission from the Conservator of Flora and Fauna. Activities that need permission to be undertaken in tree protection include soil compaction, trenching and any form of construction.

Locally abundant, but regionally rare

Attempts to increase biodiversity can be misguided where a regionally rare ecosystem such as lowland native grassland is "enhanced" through the addition of trees. While the trees may provide habitat for many species and increase the biodiversity of the site, the outcome will be negative because a regionally rare ecosystem has been replaced or reduced in size.

Patches of native grassland are often overlooked and re-landscaped because to the untrained eye they can appear unkempt.

In the ACT, and nationally, native grasslands are one our most threatened ecosystems. They are also perhaps one of the least thought of when it comes to landscaping.

Attracting Birds | secrets to success

While the number of native bird species recorded in Canberra gardens drops away with distance from major (source) habitats such as Canberra Nature Parks, Canberra's network of greenspace provides the home gardener with the opportunity to build on this source habitat by providing extra food, shelter and nesting sites within our suburbs.

Attracting the widest range of native birds to your Canberra garden demands attention to a few simple guidelines. Tips from ANU Professor Henry Nix.

1. **Food and Structure.** Bird attracting trees, shrubs and native grasses are the way to go, with a variety of species and growth forms or structures being the key. Ideally plants should be native, but some introduced species are of value, so long as they are not environmental weeds. Grevilleas, Banksias, Callistemons, Melalaucas and Correas figure prominently in garden bird lists. Smaller Eucalyptus species are also favoured, while the medium sized Argyle apple (*Eucalyptus cinerea*) is an absolute star because it is locally adapted, flowers and seeds profusely, harbours lerp insects and, if unpruned, droops to ground level and provides a range of nesting sites. Areas of open native grassland habitat including species such as Kangaroo Grass (*Themeda australis*), Wallaby Grass (*Danthonia caespitosa*), Poa and Lomandra species and native wildflowers will attract smaller bird species including finches and wrens.

2. **Shelter.** Birds need shelter from predators including cats, dogs, foxes and snakes as well as predatory bird species. A large, mature tree (exotic or native) on your site or a neighbouring one provides a vantage point for birds to check out the area for food, water and predators. Dense, spiky shrubs such as Hakea and some Grevilleas are useful refuge species. Trees and shrubs with light reflecting leaves (ie. shiny or silvery) also provide excellent shelter.

3. **Nesting.** Urban birds that nest in garden trees and shrubs are at great risk from cats and, unfortunately, Currawongs. Hole-nesting species are less prone to these predators, but suffer eviction from Common Mynas and Starlings. For these reasons, the maintenance of healthy, breeding populations of native species in critical source habitats around the city is absolutely essential.

4. **Water.** Water features are great bird attracters. Shallow dishes placed in an open area give birds the chance to keep a lookout for lurking predators. Closely sheltering shrubs tend to be less favoured locations for a water source for this reason. If you wish to build a pond, avoid drowning risk to children and observe the necessary guidelines and precautions.

5. **Maturity.** It takes 12-15 years for street trees and gardens to reach height and density that will attract the potential maximum number of bird species at a site. After this time the rate of 'new' species will drop to just one or two per year. If you are planting a new garden to attract birds, consider joining the Canberra Ornithologists Group 'Garden Bird Survey' to track the changes in birds visiting your garden over time, see http://garden.canberrabirds.org.au/

Native grasses and the small flowering plants that characterise grasslands can be used to create stunning landscape features, with grass species such as Kangaroo Grass (*Themeda australis)* exhibiting many colours over the seasons and wildflowers providing sprays of long lasting colour throughout the year.

Work within the sites constraints and attributes

Some sites, whether they exist in the back corner of your garden or school, along side a pathway or in a poorly drained part of the garden lend themselves to certain types of landscape.

It is often best to work with the natural characteristics of a site than to work against them.

Working within the constraints of the site and building on its attributes can save you time and money in construction and maintenance, as well as limiting the use of imported material such as pond liners, soil and gravel, as well as the amount of water needed to maintain the site.

A well-drained site, for example, will not lend itself to a water habitat without the use of a pond liner or formed pond. The surrounding landscape may also require frequent watering to maintain the soil moisture and microclimate likely to encourage frogs and other moisture loving species.

If the site is naturally dry, consider a dryland habitat and select plant species that will survive under the naturally occurring conditions rather than relying on frequent watering to keep them alive.

Selecting appropriate species for the soil type and position can go a long way in minimising water use and plant loss in the long-term.

Likewise a site that experiences natural pooling of water during periods of high rainfall may lend itself to an ephemeral (periodically wet) habitat. An ephemeral landscape (usually created by a depression in the landscape such as a swale) will hold water during high rainfall and drain slowly. Water may be present for a day or two or may remain for a couple of weeks or the site may simply remain wet and boggy for long periods. These habitats can provide excellent refuge for frogs during dryer periods and may also attract frogs for breeding if water remains after rain. The soil beneath such sites is typically high in clay. Landscaping the site with native plants adapted to these conditions will provide long-term benefits, both in terms of plant health and reduced maintenance requirements. Native species from ephemeral environments are particularly well adapted to the Australian climate and unlike many introduced species of boggy landscapes, they can survive the long dry spells characteristic of Canberra's summer, without excessive watering.

Urban Ponds | smart design tips

If a pond is the answer to your landscaping needs, there are safety and environmental implications to consider.

1. Ponds can pose a drowning risk to children. An outdoor ornamental pond may require both development (Land Act 1991) and building (Building Act 2004) approval if:
   - the water depth exceeds 300mm and, or
   - the above ground height of the pond wall exceeds 1.2m at any one point
2. If there are children around, your pond should be covered with a sturdy mesh as a basic safety measure, regardless of pond depth. Children can drown in less than 5cm of water.
3. Do not put introduced aquarium plants such as duckweed in outdoor ponds. These have major potential to become environmental weeds in our river systems as visiting birds can readily spread them from one water source to the next.
4. Do not put goldfish or gamboozia (Mosquito fish) in ponds. Studies of urban pond life conducted as part of the Lower Sullivans Creek Catchment Ecological Survey revealed that ponds with these fish supported very few other life forms and rarely attracted frogs.

An ephemeral habitat on the ANU campus. Designed by ANU Facilities and Services in consultation with landscape architects, the area retains water after rain. A wet spring would see the site remain wet for longer periods and enable frog breeding.

Useful Resources

A copy of the Tree Protection Act 2005, interpretive information and instructions on how to apply for approval to conduct activities associated with significant trees can be found at
http://www.tams.act.gov.au/live/environment/urbantreeprotectionintheact

The Environmental Defenders Office (EDO), a not for profit community legal centre, provides advice on Territory and Commonwealth environmental and planning law. Their website includes a guide to interpreting the Tree Protection Act 2005
http://www.edo.org.au/edoact/

For information on obtaining approvals for ornamental ponds and other major landscaping work contact the ACT Planning and Land Authority on (02) 6207 1923, hearing impaired telephone: (02) 6207 2622 or www.actpla.act.gov.au

Get Local Advice

While the internet provides a huge amount of information that is easy to access, it is a good idea to get advice from groups working in the local area or region. Local environmental groups such as catchment groups and Greening Australia, and local authorities such as the ACT Government Territory and Municipal Services play a key role in caring for our natural resources and can provide a wide array of support and advice relevant to the ACT. Greening Australia Capital Region can also provide species lists and other information that will help you plan your project.

Getting involved with local environmental groups is a good way to keep informed about environmental issues in your area as well as community activities you may wish to participate in such as Frogwatch, The Great Australian Marsupial Nightstalk, Garden Bird Surveys, Waterwatch and revegetation projects.

Planning a habitat feature

Landscaping with a view to providing wildlife habitat does not mean that your project need mimic the 'bush'. Native species are quite adaptable, and selecting the right species can allow you to create a number of garden themes to suit you personal preference and practical needs. From a natural frog hollow to a formal garden including hedges, there are native species to suit. With attention to plant species, each landscape has the potential to provide both food and habitat for local wildlife.

The best urban habitat garden will provide for both wildlife habitat and human enjoyment.

If you have pets, make sure your habitat garden features refuge for species such as lizards and birds. Refuge or shelter can be in the form of thick or prickly bushes for birds or logs and rocks under which small reptiles can hide. If your pet is particularly aggressive toward wildlife, you may consider placing your garden in an area where your pet does not have access.

Selecting Plants

If you live near a nature reserve, think about using some of the same plant species that occur in the reserve in your garden. Planting similar species will provide extra food and habitat for animals that occur locally.

It is illegal to take any plant material, dead or alive from public land without a licence.

Purchase or borrow a field guide to the plants of the ACT and take a walk around local nature reserves – this will give you an idea of the species that occur *locally* rather than in the region in general. Seeing a plant in its natural setting, where it receives no maintenance, will also be helpful if you are looking to create a low maintenance or water wise garden by giving you an indication of how well it fares in the driest of conditions.

Both horticultural and field guides provide an indication of the space each individual plant will need, as well as the soil, shade and shelter conditions best suited to each species.

Map the site

Before digging any holes, map the site out on paper and draw in all desired plant and non-plant features, using plant height and width guides to space plants. Remember that some features are best placed so that they overlap, such as shrubs and ground covers that will grow beneath taller trees, or grasses that will overhang the edge of a water feature. Taking the time to map out your site will help give an idea of what the site will look like, the number of plants you will need and ultimately the cost of your project. Paying attention to the growing habit and preferred conditions of each plant species is important in ensuring optimal plant growth and also in minimising future maintenance issues caused by plants that grow too large for the site or spread into neighbouring gardens. To achieve the best outcome:

- group species with similar preferences and needs together. Grouping plants according to their shade, soil type and watering requirements will allow you to manage the landscape more easily, resulting in better plant growth,
- do not over plant the site. It can be tempting to include a huge diversity of species and to fill every gap, however, a relatively simple selection tailored to 'grow into' the space is more likely to achieve a good outcome, for both habitat and maintenance.

Sourcing plants and seed

Native plants can be sourced from a number of nurseries in the ACT, as well as periodic plant sales (usually in spring and autumn). Plants from these sources are appropriate for garden and small landscaping projects.

When undertaking larger scale or revegetation projects, the origin (or provenance) of plants and seed can be important. Plants grown from seed collected locally have a unique genetic profile that enables them to survive in local conditions. Greening Australia Capital Region can provide information on where to purchase plant stock that has been grown from local seed.

Non-Plant Features

In natural landscapes, rocks (both small and large), fallen bark, leaf and stick litter, branches and hollow logs play an important role in providing habitat for a diversity of species. These non-plant features provide nesting and foraging sites, shelter from predators, fire and temperature extremes and basking sites for reptiles.

Useful Resources

To contact Greening Australia Capital Region: (02) 6253 3035, admin@act.greeningaustralia.org.au
or visit www.greeningaustralia.org.au

When sourcing rocks for landscaping, find out the source from the supplier. If the rock has been sourced from the bush, known as 'bushrock', and the supplier does not have a license, its removal is likely to be contributing to the decline of habitat in natural areas, and should not be purchased. Most garden centres stock quarried rocks, which provide a more environmentally friendly alternative.

If you seek the aesthetic appeal of bushrock consider artificial rocks. These can be purchased from select garden centres, or the adventurous can make their own using recycled rubble covered in mortar.

These alternatives can mimic the habitat provided by bushrock without having a deleterious impact on existing habitat.

Site preparation

It is not necessary to cultivate the entire area you intend to plant. Unnecessary cultivation can disrupt the soil invertebrates that will form the building blocks of your habitat garden. As long as weeds and undesirable plants are removed from the site and periodic weed control is undertaken, the only other site preparation required should be that necessary to get individual plants in the ground and install non-plant habitat features.

However, where weed infestations include species that have underground runners or that propagate vegetatively (from small pieces of stem), such as Vinca (see below), a level of cultivation may be required to remove the species and to prevent it regrowing.

For each plant:

- dig a hole twice the diameter of the pot or tube
- fill the hole with water and let it soak through (this can be done twice to ensure plenty of water is available to the plant as it establishes). Hydrated water crystals can also be placed at the base of each hole or mixed in with the backfill soil as per the manufacturers instructions
- break up the soil. Breaking up the soil will allow the new root system to spread with less resistance
- water in.

Pam Rooney © 2006

An environmental weed: Vinca major.

Reptile habitat | what about snakes?

One of the main concerns people have with attracting reptiles and other wildlife into the suburbs is the fear of also encouraging snakes.

The many dangers of the urban environment (including roads, domestic animals and native predators) make the likelihood of small suburban gardens playing host to snakes fairly unlikely. This is particularly the case where they are a long way from nature reserves and large habitats likely to support snake populations. If you live near a likely snake habitat, or are installing a large habitat landscape, there are a number of steps you can take to reduce the attractiveness of the site to snakes.

Residential

1. Keep rodent numbers under control, snakes find these little guys delicious.
2. Do not leave **piles** of rubbish, prunings, firewood or builders rubble in your yard, these provide prime habitat!
3. Make sure that doors on garden sheds or workshops have a close fitting rubber weather strip to stop snakes and their prey from entering.
4. Cover vents at ground level to stop snakes and their prey from getting under buildings.

In larger landscapes such as school grounds or apartment complexes, or landscapes near nature reserves, it will also help to:

1. keep grass short in areas frequented by people,
2. avoid rock piles and logs large enough to support snakes in human traffic areas, and
3. prune the lower branches of shrubs and thin out ground cover in areas near walkways so that snakes may be readily seen.

Site maintenance

Keeping maintenance to a minimum is important in saving both time and money. Water restrictions are likely to remain a feature of urban environmental management, so protecting your plants from water loss and increasing the efficiency of water use makes good environmental as well as financial sense.

There are a large number of water crystal and wetting agents on the market that can be used when preparing the soil or hole into which you are planting. These work either by storing water and or by making it easier for the plants to access available water. The addition of a handful of hydrated water crystals to the base of each hole will help plants make the most of each watering, and can reduce the need to water as frequently. This can provide plants with a head start, particularly in the early stages of establishment, and can help them survive when you are away or are unable to water.

The use of weed suppressants such as mulch can provide valuable habitat as well as reducing weed growth and saving precious water. To provide the greatest variety of habitat, particularly for the invertebrates that provide food for many other species, use mulch of varying textures (including sticks, hardwood chips, leaves and bark). A few simple rules should be observed when using homemade mulch.

Useful Resources

Make Fabulous Artificial Rock $39.95 DVD, Available online at http://www.gardensonline.com.au/

1. Chopped up or shredded clippings from pruning can provide suitable mulch, but are best allowed to dry fully before use as some are able to regrow from small pieces (just as they would from cuttings).
2. Remove ALL seed from clippings that are from introduced species or species that you do not want to spread to the new landscape.
3. Lawn clippings should be well composted before use as fresh clippings can generate a considerable amount of heat and burn the roots and stems of young plants. Fresh lawn clippings can also spread seed and runners.
4. Do not place mulch too close to the stem or trunk, whether of a young or established plant, as it can promote fungal growth and rot which can effectively ring bark the plant and result in its death.
5. Fresh organic mulches will leach tannins, resins and other compounds into the soil. As the mulch is broken down, organisms active in the process will consume nutrients; therefore a need may arise to apply fertilizer during this period to replace lost nutrients.

In addition to water crystals and mulch, new plants, particularly those with an upright form such as trees and shrubs, can be protected from water loss by using tree guards. These are plastic tubes that are placed over the plant and held in position with stakes; milk cartons can work equally well for very small plants. Tree guards help prevent plants from drying out and can also protect exposed plants from wind damage and browsing by animals. Tree guards can also provide protection from pedestrian traffic by making plants locations known.

Do not forget to remove tree guards once the plant has outgrown them.

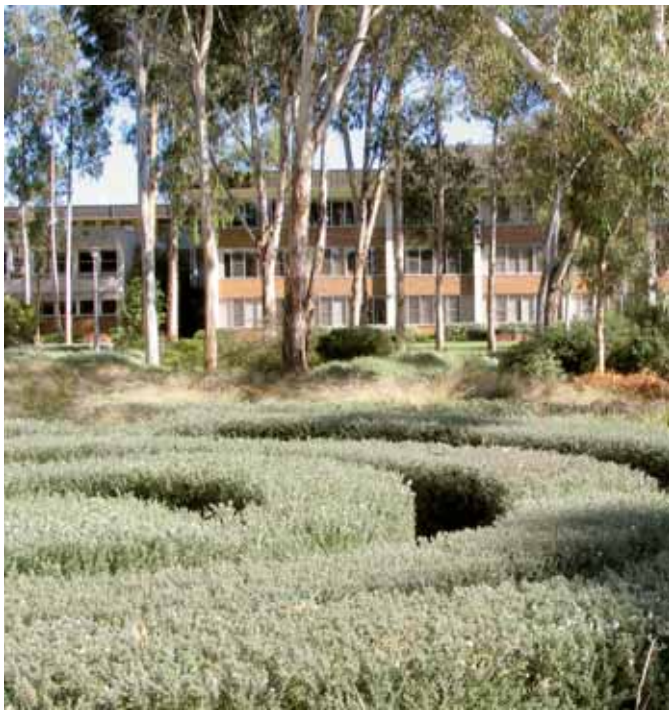
Fertilisers

Care should be taken when fertilising native plants. Commonly used fertilisers containing phosphorous can burn some native species and some types of fertiliser can cause enough damage to kill the plant. Follow the guidelines given for each species in horticultural guides. The Australian National Botanic Gardens website provides information on growing native plants, including the use of fertiliser.

To prune or not to prune?

Some gardeners avoid native gardens on the basis that they appear messy and unkempt. This perception can be attributed to a number of factors including poor species selection and the misconception that native species do not respond well to pruning.

The level of maintenance required will depend on the visual aesthetic being sought. Most native plants respond well to pruning after flowering, and indeed pruning promotes a more compact, or 'tidy' form. Pruning also promotes flowering in the following season. Some native species respond well to hard pruning and can be pruned to form hedges that compete with the best English hedgerows. Check native horticultural and gardening guides for tips and if in doubt prune lightly (no more than one third of the growth) and avoid pruning back to the 'old' wood.



A native Westringia hedge spiral creates a point of interest amidst established eucalypt trees on the ANU campus.

The fruits of time

Creating a habitat garden or landscape will not happen over night. Whether we see the fruits of our labour or whether we move on before they have been fully realised, each action we take will contribute to the future sustainability of our city. No effort is too small.

Useful Resources

A guide on selecting plants to attract native wildlife http://www.floraforfauna.com/

The Australian National Botanic Gardens provide detailed information on the cultivation and growing requirements of a large number of native plants as well gardening tips. This site is a must for those planning a native garden. http://www.anbg.gov.au/gnp/index.html

The Australian Native Plant Society website provides a list of nurseries that stock native plants from across Australia as well as gardening tips from propagation through to water wise gardening. ANPS have two native plant sales a year, and these are held at the Australian National Botanic Gardens. http://nativeplants-canberra.asn.au/where_buy.htm

For a list of Native Plant stockists in the ACT, click on 'Resources and Links' at http://www.lifeinthesuburbs.net.au/

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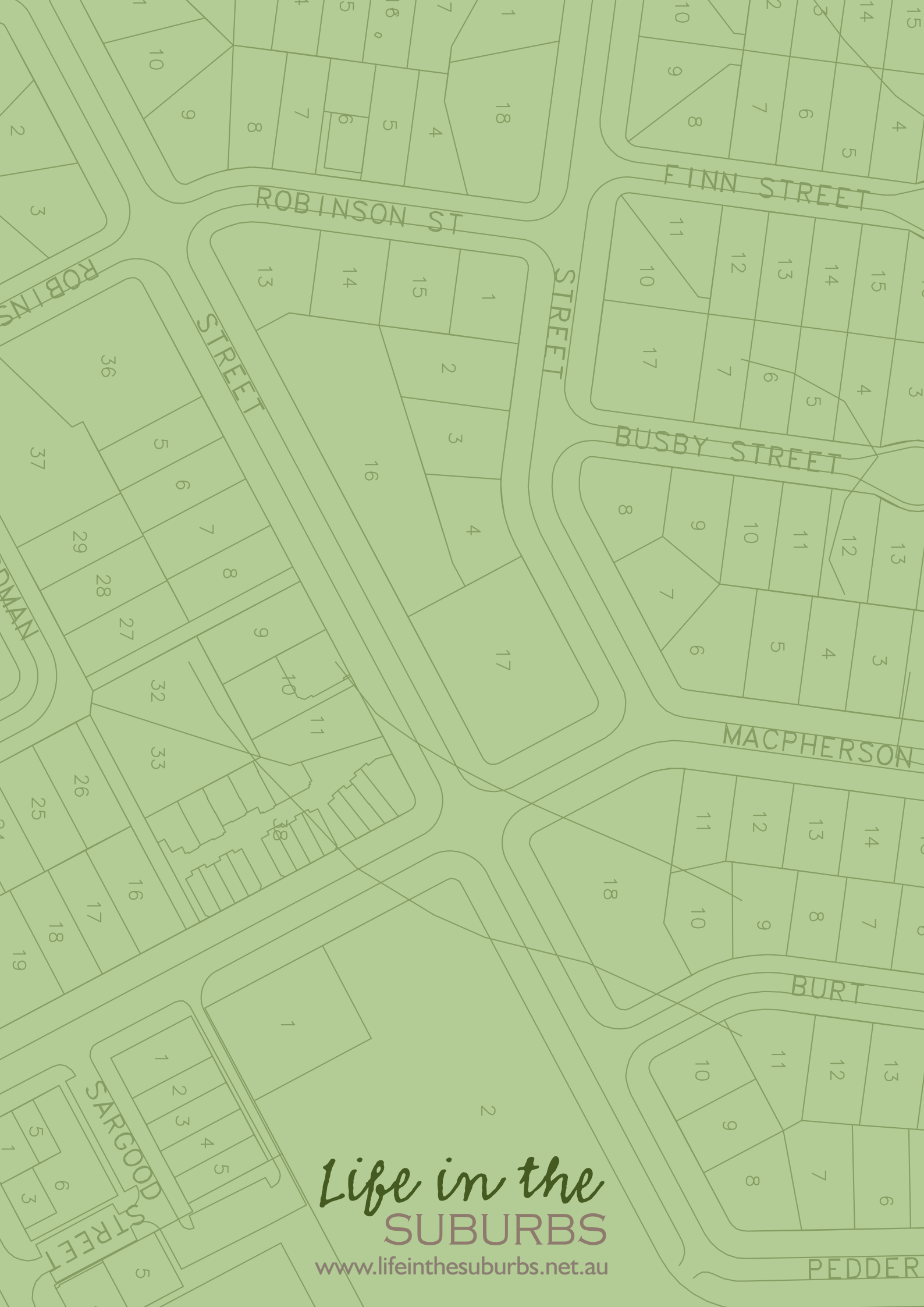
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