Chapter 30
Human Dimensions of Wildlife Gardening: Its Development, Controversies and Psychological Benefits

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Abstract A prevalent social discourse concerning climate change, loss of biodiversity and the importance of nature to human health currently dominates news articles, television programmes and political comment. These anthropogenic impacts on the natural environment question humankind's predominant relationship with nature; particularly in western developed cultures where people are usually perceived as separate from nature rather than part of it. Whilst the world's declining iconic species catch media attention, it is often local and indigenous wildlife that become the focus of communities at a local level. As a result, conservation organisation membership has increased over the last 5 years alongside a strong retail sector which encourages people to purchase, for example, wild bird food, bird feeders and nest boxes. As interest in feeding the wild birds that visit gardens has increased, so too has an appreciation of the need to conserve the wider aspects of the ecosystem such as plants, insects and amphibians which attract and support the birds and mammals that have become more welcome visitors to our gardens. There is also increasing recognition of the health and psychological benefits that wildlife gardening can bring to individuals and communities. Many prominent garden attractions and horticultural shows in England and throughout the world have developed a wild theme into their garden design which has captured the imagination of garden visitors who wish to marry their love of horticulture with their interest in wildlife. Such naturalistic and wild flower planting has thus become a more common element of home garden design reflected in the retail sector, media programmes and garden magazines and books.

Keywords Wildlife · Macro landscapes · Micro landscapes · Human interaction · Psychological benefits · Ecology · Eco-therapy · Biodiversity · Anthropogenic influence

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Introduction

With a little imagination and understanding, wildlife gardening provides the opportunity to bring nature back into our lives not only for the aesthetic beauty and pleasure that flora and fauna brings but also for the sensual pleasures that can be derived from the sound of birdsong, the croaking of amphibians and the movement and spectacle of insects such as bees, dragonflies and butterflies that can be attracted into our gardens. With the help of wildlife conservation agencies, the growing media related to gardening and conservation, and the awareness of global environmental degradation, wildlife gardening has recently become more mainstream. Forty years ago, the majority of people would have scorned the idea of gardening for wildlife. Gardens were a place where the control of any wildlife which prevented or reduced high production of flowers or produce was the primary *modus operandi*; gardeners were encouraged to reach for insect sprays at the first signs of damage. Today, however, we are realising that every living thing is part of a complex chain; a web of life, with a myriad of symbiotic relationships and connections from one species to the next. We do not fully understand these connections but by now we have witnessed the loss of species which have been systematically destroyed by urbanisation, a growing human population and agricultural practices directed purely towards maximum yields: the resultant loss of biodiversity is a distressing harvest to reap. At a time when natural habitats are declining at an alarming rate, conservation organisations see gardens as essential corridors; highways and oases of modified habitat which can be exploited by wildlife.

It is a general misconception that a wildlife garden is an unkempt space where nature has been allowed to take over. Quite the opposite: Ryrie (2003) suggests that there is greater biodiversity in a well managed wildlife garden which has a wide variety of plants and habitats rather than one which has been allowed to become tangled undergrowth. The purpose of this chapter is to highlight and examine the changing attitudes and understanding of wildlife gardening and the sometimes complex and conflicting relationship between wildlife and horticulture. It does this amidst a discussion of the human attraction of wildlife, the psychological benefits that can be gained from creating a sanctuary where wildlife can be enjoyed and the psychological processes that are involved in the personal emersion and enjoyment of nature whether in one's own garden or in a horticultural visitor attraction.

Human Dimensions of Wildlife

Human affiliation and affection for wildlife is a very complex and dynamic phenomenon. There is general agreement amongst commentators that public values towards wildlife have changed considerably in the developed world over the last 50 years (Manfredo et al. 2003) during which time there has been a gradual shift away from traditional wildlife values that emphasise the use and management of wildlife for utilitarian reasons towards a greater appreciation of the aesthetic, psychological

and ecological importance of wildlife. Inglehart and Baker (2000) propose that during the industrialisation and urbanisation phases of a nation's development, nature is regarded as something to be conquered or controlled; materialist values are focused on human 'material' needs such as security, housing, economic development and jobs. Following materialism and urbanisation, people can experience a 'call of the wild' in which they exhibit an inherent, biological need to reconnect with the nature that is missing in their busy, urban lifestyles (Wilson 1984). This is evidenced by a greater number of people keeping pets, gardening, contributing to conservation organisations, wildlife watching and feeding garden birds. This ultimate return to the natural world is perhaps not that surprising given that its beauty and diversity have been a constant source of inspiration throughout human history, influencing traditions, the way societies have evolved and supplying the basic goods and services upon which trade and the economy is built (van den Duim and Caalders 2002).

Relations between humans and wildlife have deep evolutionary roots and are particularly complex. Animals are our companions, our food, our clothing, a source of spiritual enlightenment and a focus of stories, fables, poetry, sport and art. The boundaries between 'animality' and humanity are thus socially, culturally and scientifically bound, and blurred, as we position ourselves as part of the animal kingdom on the one hand yet distinctly separate from it on the other. However, any observation of the animal kingdom can immediately recognise the connections between animal and human behaviours; their curiosity, playfulness, foraging for food, rearing young and belonging to social groups are the building blocks of our own existence. As animals cannot reveal their thoughts to us, it is human nature to impose our own anthropomorphic interpretations of their world given our shared common life domains of survival, acquisition of territory and reproduction. We may see the theatre of our own lives similarly displayed in theirs. As Mabey explains:

> An honest experience of nature would find that the natural world is an arena of endurance, tragedy and sacrifice as much as joy and uplift. It is about the struggle against the weather, the perils of migration, the ceaseless vigilance against predators, the loss of whole families and the brevity of existence. The natural world is like a theatre, a stage beyond our own, in which the dramas that are an irreducible part of being alive are played out without hatred or envy or hypocrisy. No wonder they tell us so much about ourselves and our own frailties. (2006, p. 13)

This 'mutuality of behaviour' makes animals a source of fascination because they are more than mere objects. Wild creatures are subjects that provide 'a window into which we can look and from which someone looks out' (Rolston 1987, p. 26). This can be particularly true in the case of fellow mammals but also to some degree the amphibians, birds, butterflies and other insects that visit our gardens. As they inhabit our 'created' garden spaces, it is easy to become involved and watchful over their day to day existence. Gardeners themselves are also becoming more aware that their gardens are important for the conservation of wildlife, especially given the gradual encroachment of development into once thriving wildlife habitats and the proliferation of house-building and urban development in countries such as the United Kingdom where the competition for land is high. There is therefore an added enjoyment and dimension to be had from a garden that entices wildlife and

persuades it to stay; a haven that is purposively and lovingly created by its owner. Modern conceptions of nature are informed by a combination of personal experience, scientific understanding and social construction. Clayton and Myers remind us that 'beliefs about what nature is, as well as the way in which nature is valued, are created within a historical and cultural context' (2009, p. 15). Media representations of wildlife, popular narratives and wildlife marketing communications play a pivotal role in socially constructing ideals of nature and what constitutes charismatic or desirable wildlife in the context of gardening.

It is suggested that 'birds are the most visible and charming of the garden's inhabitants and visitors' (Harper et al. 1994, p. 114). Whether this is the sight of them or hearing bird song varies between individual householders. Similarly bees are nurtured not only for the honey that they provide, but also for their sound as Middleton recorded, '…I have spent many happy hours …listening to a sound like the deep diapason note of a great organ—the music of a thousand bees in the lime-tree up above' (Middleton 1939, p. 240). Similarly butterflies add another dimension of colour and movement. Why some species are more encouraged than others is likely to be based on personal reasons as well as sub-cultural ones. For example urban and rural sentiments can be astoundingly different when it comes to charismatic wildlife. In urban areas of England, the red fox (*Vulpes vulpes*) is often encouraged into gardens through feeding. However in rural areas it is subject to hunting (albeit limited in its form by legislation). Harper also suggests that cultural biases are "in favour of 'nice' (large, attractive, cuddly, rare) organisms and against those that: seem dull or common; sting or are poisonous: these so-called pests, and creepy-crawlies; are associated with death, decay, and excrement" (Harper et al. 1994, p. 123). That said, some insects do not fit this description at all and are welcomed because of their beauty, usefulness or charismatic qualities, i.e. butterflies, dragonflies, ladybirds, fireflies and glow-worms.

Wildlife in Gardens

The study of wildlife in domestic gardens has increased both at an amateur and academic level over recent decades. Although it is not a new phenomenon, as two early British books demonstrate. The Book of Garden Animals by Daglish (1928) 'gives accounts from the naturalist's point of view of most of the animals generally found in gardens, with their life-histories' (Hadfield 1936, p. 551). Similarly for birds 'Every Garden a Bird Sanctuary' by Turner (1935) is described as 'An up-to-date book on the practical aspects of birds in the garden, and a full account of garden sanctuaries, feeding, nest-boxes, baths etc.' (Hadfield 1936, p. 552).

The relationships between people and wildlife in their gardens have probably always been mixed, with both positive and negative elements. Sudell (1950) suggests that from a horticultural perspective, birds can be classified as harmful, beneficial, or neutral, based on what they eat. A bird is harmful if, he argues, it eats food grown for human consumption, such as fruit. It is beneficial, if it consumes something lower in the food chain that damages people's crops, and neutral, if the bird's food

source does not affect people (such as wild grasses). In fact, all wildlife in gardens can be thought of in this way, although it must be acknowledged, that many species may change in the way that they are perceived throughout the year. A bird that is viewed as a pest whilst it is consuming fruit is an ally when its diet returns to one of damage-causing insects for the greater part of the year. Similarly views can change during the life cycle. A gardener might seek to eliminate a caterpillar but the butterfly of the same species might be welcome. Also they may view something as a pest in one part of their garden, but tolerate it in another. Finally of course, not all garden owners view a particular species in the same way. For example, whilst some residents in Nova Scotia, Canada, feed sunflower seeds to Eastern chipmunks (*Tamius striatus*) for the pleasure of watching them, others use a half-filled bucket of water with the sunflower seeds floating on the surface in order to entrap them. As Ellis (ca. 1935, p. 112) noted however regarding birds in England 'we are perhaps apt to notice the relative amount of harm more than the good done by these beautiful and cheery inhabitants and visitors of our gardens'.

Destruction of Garden Wildlife

There is a long tradition of eliminating wildlife in gardens if they are harmful. Harm may not only be to food crops as Sudel (1950) suggests but also includes damage to flowers (e.g. the sulphur-crested cockatoos (*Cacatua galerita*) which destroy the flowers of ornamental tulip (*Tulipa*) cultivars in the Sydney region of New South Wales, Australia and damage to lawns (e.g. the chinch bug, (*Blissus leucopterus hirtus*) which are sucking insects that attack St Augustine grass (*Stenotaphrum secunatum*) in the southern states of the USA (Wyman 1971). Similarly harm may occur in ponds or other water features and may not only be caused by herbivores, although this is the most damaging, but also by carnivores and omnivores, which one might think would be a gardener's allies.

Efforts to destroy or control unwanted wildlife using chemical and other methods are described in earlier chapters of these volumes but it is worth noting here that modern techniques especially those espoused by organic gardeners are less damaging to wildlife overall. Techniques such as using barriers, for example, frames to protect brassicas against pests such as the caterpillars of the large white butterfly (*Pierris brassicae*) and small white butterfly (*Pierris rapae*) in England, and similarly the cabbage looper (*Trichoplusia ni*) in the USA (Wyman 1971) have proved extremely effective in protecting the crops without destroying the wildlife.

The Introduction of Non-native Flora and Fauna

Throughout the world, gardens are a combination of native and non-native species of both flora and fauna. Arrivals have been both natural through for example, seed dispersion and migration but also anthropogenic. There has been a long tradition

of deliberate introduction of exogenous species for consumption, aesthetics, or for reasons of grandeur. The tomato (*Lycopersicon esculentum*), by way of example, originated in Mexico, was commonly eaten in Europe for centuries but regarded as poisonous in the USA and only grown in gardens there as an ornamental, known as the 'love apple' (Anon 2012a). The common Indian myna bird (*Acridotheres tristis*) was first introduced to Australia to control insect pests, and is often fed by unsuspecting householders. However, in 2000, the International Union for the Conservation of Nature (IUCN) declared it to be one of the world's most invasive species, as it is extremely aggressive, chasing out native birds, almost to extinction in Polynesia, Hawaii, and Mauritius (Thomas 2012).

In many countries the goldfish (*Carassius auratus*) sometimes known as the Golden Carp, has been introduced as a prized ornament in garden ponds. It is omnivorous and requires additional special fish meat meals, but it can come into conflict with coarse fish from natural ponds and streams as it often attacks other fish when breeding (Sudell 1950). However, many introduced species, particularly plants, bring great pleasure to gardeners, without adverse impact on the native biodiversity. A survey of 61 domestic gardens in the old industrial city of Sheffield, in England, showed a total of 1,166 species of flora, of which only 30% were native, although the gardens, irrespective of size, contained on average 45% natives. Seventy-nine per cent of the species that were recorded only once were alien, demonstrating the extent of plant introductions in British domestic gardens. However, the flora included 72% of the plant families recorded in the wild in Britain and Ireland (although the latter include native and naturalised species), suggesting that many of the aliens could be important sources of fruit, pollen or nectar for wildlife (Smith et al. 2006).

Movement of wildlife into additional gardens without direct human intervention has also occurred, for example the Northern cardinal (*Cardinalis cardinalis*) and American goldfinch (*Carduelis tristis*) have increased their northward expansion from the USA (Robb et al. 2008) into the gardens of Nova Scotia, Canada. Similarly the European goldfinch (*Carduelis carduelis*) was introduced at numerous places in south-eastern Australia in the nineteenth century, and their populations quickly increased and their range expanded greatly to where they now range from Brisbane, Queensland south to the Eyre Peninsula in South Australia.

The creation of gardens requires the destruction of other habitats, often natural habitats, which support extensive biodiversity. It must be acknowledged that much wildlife in a garden may not be seen or perceived, for example there are microscopic mites, including the parasitic mite (*Varroa*) destructor of honey bees, along with protozoa, bacteria and viruses (Harper et al. 1994). These are all part of the ecology of a garden with important roles to play. Nonetheless, as noted below, many organisations encourage householders to use their gardens to support wildlife although this may not be easy initially, as Harper et al. (1994, p. 58) note: 'creating a space for the benefit of wildlife involves unlearning many old patterns, a relaxation of control, and finding out what can be persuaded to live in your garden'.

Means of Supporting Wildlife in a Garden

Wildlife can be encouraged to enter into a garden and then remain there, through two principal means—provision of an appropriate habitat and supplementary feeding. For example, leaving leaf litter and mulching in New South Wales, Australia provides the common or eastern blue-tongued lizard (*Tiliqua scincoides scincoides*) with shelter and a habitat for its diet of snails and other garden pests. Similarly providing a pile of fallen logs for beetles, or leaving seed heads and dead stems over winter for ladybirds (ladybugs) (*Coccinellidae*) is also effective. Wildlife in temperate zones may also need suitable habitats for hibernation and piles of old leaves or straw provide appropriate materials for the European or common hedgehog (*Erinaceus europaeus*) to hibernate as well as nest. Other simple actions are also suggested by conservation organisations such as advising householders to leave small gaps at the base of walls and fences to afford movement of hedgehogs between gardens.

Nesting materials, such as grasses and moss are sought by many bird species and in the USA, Wyman (1971, p. 137) suggests 'providing thickets of shrubbery for nesting purposes'. In European countries the house martin (*Delichon urbica*), a summer migrant from Africa, can be encouraged by providing water from the edge of streams, ponds or even puddles to mix the mud needed to build nests under the eaves of buildings. Other water sources, such as ponds are also beneficial. There are over 3 million ponds in England that is, in approximately 16% of gardens (Davies et al. 2009). In the Sydney suburbs of New South Wales, garden ponds provide habitats for frogs, some of the 37 species of native amphibians found in the city (Anon 2012b). Additionally, ponds, bird baths and even dishes of water provide not only a source to drink, but also a means to clean their feathers.

The construction and careful siting of artificial nesting boxes can also make a valuable contribution to encouraging wildlife into the garden. For example, it is estimated that there are a minimum of 4.7 million nest boxes in British gardens, that is, one nest box for every six breeding pairs of cavity nesting birds (Davies et al. 2009). Bat houses, constructed similarly to bird houses, except that they have a slit and a crawl-board instead of a hole and a perch provide effective summer roosts and/or hibernation for the pipistrelle bat (*Pipistrellus pipistrellus*), Britain's smallest but most common bat (Harper et al. 1994). Insects too, can be supported through the production of 'bee-quarters', that is a can full of 7 mm in diameter paper straws secured in a crevice in a wall (Harper et al. 1994).

The easiest and therefore the most common means of supporting wildlife is through planting, whether it is planned with that purpose in mind or purely incidental. Some of the hundreds of forms of Buddleia are widely grown throughout the world, because they are so well known in encouraging butterflies into a garden, so much so that *Buddleia davidii* is often nicknamed the 'butterfly bush'. In France, shrubs recommended to encourage butterflies include, varieties of *Berberis, Hedera*, and *Lavandula, Lonicera periclymenum, Rhamnus frangula* and annuals

Fig. 30.1 A plastic container of water for rainbow lorikeets on the wall of a Sydney suburb

cornflower *Centaurea cyanus*, and cultivars of *Scabious and Scabiosa* (McHoy 2000). In fact the flowers of many shrubs and plants provide nectar and pollen for insects, butterflies, hoverflies and bees (Harper et al. 1994), whether or not that was the intention of the gardener in planting them. Furthermore as Thompson (2006) demonstrated, they do not need to be native species to be effective.

Appropriate planting can similarly encourage birds into a garden and in Barbados the red flowered blossom of the Antigua heath (*Russelia equisetiformis*) is planted to attract the Antillean crested hummingbird (*Orthorhyncus cristatus*). Nectar rich Australian natives, such as *Banksia*, *Grevillea* and *Callistemon* (bottlebrush) are planted in Sydney, Australia to attract the noisy miner (*Manorina melanocephala*), the little wattlebird (*Anthochaera chrysoptera*) and rainbow lorikeets (*Trichoglossus haematodus*), amongst others (Fig. 30.1).

Whilst gardens are often planted with the provision of bird food as a secondary consideration, supplementary feeding of birds is a deliberate action to support wildlife. Feeding wild birds is a common practice among gardeners throughout the western world (O'Leary and Jones 2006) and more recently in many developing countries too. It is estimated for example, that in Australia, 25–57 % of households feed birds, whilst in the USA approximately 43 % of households regularly feed birds (Martinson and Flaspoler 2003) whilst the figure is 48 % of households in England (Davies et al. 2009). Seed is the most provided food with householders in the US and England purchasing 500,000 t of birdseed annually (O'Leary and Jones 2006). Simply scattering the seed loosely on the ground is common. For example, Haikou, in Hainan Province on the southern coast of China, has a subtropical climate and there are opportunities to see a number of endemic bird species such as the White winged magpie (*Urocissa whiteheadi*), which are fed with millet seed by the local residents. In Southern England, a mix of sunflower and smaller seeds attract some of the nation's favourite birds, such as blackbirds (*Turdus merula*), robins (*Erithacus rubecula*), and house sparrows (*Passer domesticus*) as well as the less loved woodpigeon (*Columba palumbus*) and magpie (*Pica pica*). Sunflower seeds are also used to attract ground feeders such as the mourning dove (*Zenaida macroura*) in the USA and southern Canada. Placing the seed on a bird table is useful not only

when there is snow on the ground, but also keeps wild birds out of the reach of domesticated animals.

Sunflower seed in bird feeders attracts those birds that feed on the wing such as blue jays (*Cyanocitta cristata*), American robin (*Turdus migratorius*), black-capped chickadees (*Poecile atricapillus*), red-breasted nuthatch (*Sitta canadensis*) and several species of woodpecker including the *d*owny woodpecker (*Picoides pubescens*), northern flicker woodpecker (*Colaptes auratus*) and the pileated woodpecker (*Dryocopus pileatus*) in eastern Canada. Similarly balls of seeds can be hung from the branches of trees to attract birds.

Other popular foods for bird feeding include suet in a feeder (Canada) and cooked long-grain rice scattered on the ground, early in the morning and evening, in Barbados to attract blackbirds (*Quiscalus lugubris*), sparrows (or more accurately the Barbados bullfinch) (*Loxigilla barbadensis*) and wood dove (*Zenaida aurita*). Bread crumbs are popular in England, although as Middleton noted, 'the tamest of all my feathered friends is a cock robin, who sits on the seat beside me, and even on my knee. He is not a vegetarian, and scorns breadcrumbs, but has a great fancy for bits of bacon rind, which I save specially for him' (Middleton 1939, p. 241). Meat is also provided in Australia for Australian magpies (*Gymnorhina tibicen*), the laughing kookaburra (*Dacelo novaeguineae*) (O'Leary and Jones 2006) and the tawny frogmouth (*Podargus strigoides*). It is not just birds that receive supplementary feeding, for example, in England, fat and commercial dog food are put out for mammals including hedgehogs (*Erinaceus europaeus*) and the red fox (*Vulpes vulpes*) respectively.

Encouraging Wildlife for Horticultural Reasons

Wildlife has been recognised as beneficial in the garden for horticultural reasons, as Sudell (1950) noted. This includes bees for pollination and worms for aerating the soil. Organic gardener, Lawrence Hills, Founder of the Henry Doubleday Research Association (Hills 1989) reported that in an average hectare (two and a half acres) of grassland, 100 t of soil pass through the digestions of 3.75 million earthworms (*Lumbricus terrestris*). In dry climates, ants and termites take on the worm's role (Harper et al. 1994).

Birds also have a horticultural role, for example in England, blue tits (*Cyanistes caeruleus*) consume 'enormous quantities of insects and grubs during the breeding-season' (Sudell 1950, p. 99). Hills suggests hanging 10 cm (4″) square piece of fat above rose bushes, only big enough for two members of the tit family, blue (*Cyanistes caeruleus*), great (*Parus major*) and coal (*Periparus ater*) to feed at a time, encouraging those birds waiting their turn to search the bark at the base of the bushes for greenfly eggs (Hills 1989). Similarly, ramshorn water snails (*Planorbis corneus*) and freshwater winkles (*Paludina vivipara*) consume decayed organic material including any surplus fish food and algae from the sides of the pond (Perry 1955).

Encouraging Wildlife for Conservation

Generally, people view gardens as an opportunity for encouraging wildlife. Almost half of the respondents in a study in Sheffield, England thought that city gardens contribute to improved environmental quality by creating 'a better environment for wildlife' (Dunnett and Qasim 2000). Gardening for wildlife as described above, provides not only habitats, both permanent and transient, but also a richer variety of habitats and additionally, corridors between habitats (Harper et al. 1994). Furthermore, collaborating "with neighbours to create a 'critical mass' of a particular type of habitat" (Harper et al. 1994, p. 11) or a scarce habitat can be of additional benefit. It is this detailed understanding of wildlife which is of such importance, as large gardens are not better than small for wildlife, nor suburban better than urban, as the Biodiversity in Urban Gardens in Sheffield (BUGS) project showed (Thompson 2006). This programme also confirmed Harper's view that 'Of all the garden developments you can undertake to increase habitat diversity, ponds are probably the most effective and the most gratifying' (Harper et al. 1994, p. 113).

Nonetheless, supplementary bird feeding is widely perceived as a positive activity and is likely to benefit many species, including some of conservation concern, but we still have only a relatively basic understanding of how it affects bird populations. Catterall (2004) observed that planting of eucalypts and nectar-rich native plant species in gardens in Queensland, Australia led to a decrease in the number of species of small-bodied birds, and an increase in numbers of the large, noisy miner (*Manorina melanocephala*). Similarly, Fuller et al. (2008) demonstrated that whilst supplementary feeding increases the total number of birds in an area, it does not increase the number of species. They concluded that 'variation in habitat quality and availability are likely to be much more important drivers of species richness patterns than resource availability, particularly in urban environments' (Fuller et al. 2008, p. 135).

Concerns have also been raised that some species of birds could become reliant on supplementary feeding by people. However, a study of Australian magpies (*Gymnorhina tibicen*) in suburban environments in Queensland, Australia showed that fed birds still obtained 76% of their food from natural sources. Although their natural behaviour was influenced as they obtained less food items by ground foraging in the morning than unfed magpies and their breeding activities started earlier than the unfed birds. They showed too that in most cases, earlier broods had better survival rates than later ones, enhanced clutch size, hatching success and chick growth rate. The authors determined that the 'magpies were not reliant or dependent on supplementary food provided by wildlife feeders at any time during the breeding season' (O'Leary and Jones 2006, p. 208). However, as it has been shown, feeding influences all aspects of bird behaviour, from daily-survival to large-scale migration. Robb et al. (2008, p. 476) concluded that even 'natural selection is being artificially perturbed, as feeding influences almost every aspect of bird ecology, including reproduction, behaviour, demography, and distribution'.

There are other concerns too, for example, bird feeders have been implicated in the rapid spread of mycoplasmal conjunctivitis through the house finch (*Carpodacus mexicanus*) population in the USA (Fischer et al. 1997). In England, it is suggested that Trichomonosis in greenfinches and chaffinches is similarly spread. 'Disease transmission appears to vary according to the type of feeder used, the number of birds visiting it, and the habitat in which the feeder is located' (Robb et al. 2008, p. 481).

However, there is often little distinction between native and non-native species when information is given about wildlife and it appears that many people neither distinguish between the two, nor in fact care about the distinction. Similarly, which species to encourage has changed over time. In England, Wright (ca. 1902) recommended growing ivy on trees, garden fences and walls to provide a habitat for the common magpie (*Pica melanoleuca*) because they destroy vermin such as mice, voles and young brown rats. Today the European magpie (*Pica pica*) is viewed as a predator as they also collect other bird's eggs and kill nestlings to feed their own young. The British cuckoo (*Cuculus canorus*) is also traditionally disliked, being a brood parasite which lays eggs in the nests of other smaller species of birds, such as meadow pipits (*Anthus pratensis*) and reed warblers (*Acrocephalus scirpaceus*) (Anon 2012c). However the species is on the IUCN Red List, facing a decline in England of 63 % (Anon 2012d).

There can be unintended consequences of conservation efforts by gardeners, too as 'ecology' and 'gardens' have rarely been studied together, probably because of 'their fragmented ownership and essentially private nature' (Thompson 2006, p. 142). As Cannon (1999, p. 287) notes in an opinion piece in Bird Conservation International, 'what is the real global conservation value of a British suburban garden, with its neat little lawns, nut feeders and nestboxes? In my garden, fledgling blue tits (*Parus caeruleus*), a species of no conservation concern, are busy devouring expensive imported peanuts whose production occupied prime agricultural land in a poor country. Pure entertainment, and a sentimental luxury.' However, he then goes on to argue that at the local level, gardens can be of value, citing amongst other examples, the central area of Chile, where natural habitat destruction has heightened the importance of gardens as refuges.

The fact remains that gardens are good for wildlife conservation. Over the past 50 years, the UK has seen the loss of 98 % of wildflower meadows, 50 % of ancient woodlands, 60 % of lowland heathlands, 80 % of downland sheep walks, and 50 % of lowland fens and mires (Baines 2000); all caused by urban sprawl, overgrazing, grubbing out of hedgerows and intensified agriculture. This makes Britain's 22.7 million domestic gardens with a total area of 432,964 ha increasingly important for wildlife conservation (Davies et al. 2009). To this end, wildlife gardening is heavily promoted by the Government and the prime wildlife conservation charities, the Royal Society for the Protection of Birds (RSPB) and the Wildlife Trusts of Great Britain. Over the last 10 years there has been increasing retail space given over to wildlife feeding/ housing in garden centres and nurseries all over the country that profit from the increased demand for wildlife gardening merchandise.

Davies et al. (2009) estimate that in the UK alone, approximately 12.6 million (48 %) households provide supplementary food for birds, 7.4 million of which specifically use bird feeders. Similarly, there are a minimum of 4.7 million nest boxes within gardens. These figures equate to one bird feeder for every nine potentially feeder-using birds in the UK. Gardens also contain 2.5–3.5 million ponds and 28.7 million trees, which is just under a quarter of all trees occurring outside woodlands.

Conservation organisations have also encouraged people to become interested in birds through national events such as the Big Garden Bird Watch which has been running for over 30 years. They are organised by the British Trust for Ornithology (BTO) and the Royal Society for the Protection of Birds (RSPB) (Anon 2012e, f). Designed primarily as an indoor winter activity for children to become interested in birds, it is now undertaken by over half a million people who regularly take part counting the birds that visit their gardens. This has allowed the compilation of 30 years' worth of records detailing garden bird population trends. Indeed most conservation societies in Britain such as The Wildlife Trusts for Great Britain, the RSPB, the BTO, the Butterfly Conservation Society, the Bumblebee Conservation Trust; likewise the National Audubon Society in the USA all promote and provide information on wildlife gardening. Taking part in national surveys and adopting pro-environmental gardening behaviours clearly instill a feel-good factor for gardeners. Understanding how a sense of connection to nature can impact upon people's decisions to seek out nature in their daily lives is important if we wish to encourage the practice of wildlife gardening as a tool to enhance both connection to nature and urban/rural biodiversity.

Psychological Benefits of Wildlife Gardening and Nature Appreciation

Conservation psychology is a relatively new branch of psychology which looks at the reciprocal relationships between man and nature; notably how people behave toward nature and how people care about or value nature. Part of its focus is to study ways of getting more people involved in, or supporting, conservation with the premise that concrete experiences of nature lead to an emotional affinity towards it and a motivational basis to protect it (Kals et al. 1999).

In his 'biophilia' hypothesis, Wilson (1984) posits that the natural world continues to influence the human condition through our previous close and evolutionary relationship with it. He suggests that technological development has been so rapid that it outpaces our adaptation to modern environments. Therefore inherent in all of us is a need to be with nature through 'an innately emotional affiliation to other living organisms' (Wilson 1993, p. 31). Experimental evidence in support of the theory was provided by a series of conditioning experiments by Öhman (1986). These demonstrated that physiological and emotional responses to natural threats such as snakes and spiders could occur subliminally, despite the participants in the experiments having no conscious recognition of having seen the stimuli before. It was also shown that modern fears such as guns do not invoke similar responses. When it

comes to emotional affiliation, environmentalists and nature writers have long since maintained that humans derive psychological and physical benefits from spending time in the natural world (Mayer 2009; Kaplan and Talbot 1983). Research has shown that exposure to nature alleviates aggression, anxiety and depression (Van den Berg 2005), improves mental health and cognitive capacities (Kuo 2001; Wells 2000; Kaplan and Kaplan 1989) aids the healing process (Ulrich 1983) and provides opportunities for reflection (Curtin 2009; Herzog et al. 1997).

There are two important theories that underpin most of the work on the psychological benefits of nature. These are Attention Restoration Theory (Kaplan and Kaplan 1989) and the aforementioned biophilia hypothesis (Wilson 1984). Interest in these formative theories has recently emerged due to a growing unease caused by the recognition of the damage we are doing to the environment and the sociological, physical and psychological challenges of living in modern, affluent, hyperconsumptive societies (Bauman 2001).

The assumption that contact with nature provides people with restoration from stress and fatigue is not a new concept. Experiences in nature have long been seen to have health benefits. The idea you can be mended by the healing currents of the great outdoors goes back to classical times (Mabey 2006). The Romans recommended rambling as a way of resolving emotional tangles (*solvitur ambulando*) and the French philosopher Foucault (2001, p. 62) wrote that the countryside, '*by the variety of its landscapes wins melancholics from their single obsession by taking them away from the cause and the memory of their sufferings*'. The fact that nature reduces stress is predominantly accredited to the Attention Restoration Theory (ART) first espoused by two psychologists Kaplan and Kaplan (1989, 1995) who studied the effects that the natural environment has on the brain. They began this work by looking at levels of concentration.

Their theory proposes that prolonged and/or intensive use of *directed attention* diminishes a person's capacity to ward off distractions which is evidenced by difficulty concentrating, increased irritability and increased rate of errors on tasks which require concentration; thus creating stress because they have less cognitive resources to cope with everyday demands (Kaplan and Kaplan 1995). This is referred to as '*directed attention fatigue'* (Bird 2007). Where a stimulus is weak or uninteresting, it takes greater effort to block out more attractive but less important distractions. This is mentally demanding as the brain uses inhibitory control mechanisms which magnetic resonance imaging (MRI) scans show to be situated in the right cortex of the brain (Kastner et al. 1998); the same part of the brain which is affected in children with deficit hyperactivity disorder (Bird 2007). Examples of directed attention include driving in traffic, studying, working at a computer and making numerous phone calls. Directed attention fatigue is prevalent in people who are stressed, overworked, bereaved or sleep deprived and is a widespread condition of modern life which is overloaded with information, communication and multiple stimuli that either demand our attention or need to be blocked out.

In contrast to directed attention, *involuntary attention* or 'fascination' is effortless and is naturally held when a person finds the activity such as wildlife gardening interesting and absorbing. Recovery from directed attention fatigue requires restorative environments and activities which do not use the tiring inhibitory control

mechanism. Attention restoration involves clearing the mind, a recovery from fatigued directed attention, the opportunity to think about personal and unresolved problems and the chance to reflect on life's larger questions such as direction and goals. Clearing the mind and recovery from fatigue is called *attentional recovery* whereas dealing with personal problems and thinking about philosophical viewpoints is *reflection*. Together, reflection and attentional recovery completes the *restorative process*. The outdoor environment is usually restorative but according to Kaplan and Kaplan (1995) it is only so if it:

1. Involves **being away**, i.e. be in a physically distinct location.
2. Has **extent**, i.e. the location must be absorbing and somewhere which is distinct where a person can settle into and where there is enough to see, experience and think about.
3. Is **fascinating** to behold, i.e. effortless attention allows the inhibitory fibres to relax, since they no longer have to block out distractions. Fascination can be divided into **hard fascination** (e.g. watching sport, television and computer games) which holds attention effortlessly but does not allow enough space for reflection, and **soft fascination** (e.g. looking at nature, exploring countryside and gardens) which holds one's attention to allow **attentional recovery** but also allows time and space for personal **reflection** and time to stand and stare.
4. Is **compatible** with our expectations, i.e. the setting must be able to provide what the seeker requires of it without it being a struggle (Hartig et al. 1991).

The activity of gardening and the enjoyment of a garden as a place of sanctuary meet much of the above criteria and produce aesthetic, spiritual and psychological benefits that extend beyond the growing of plants (Dunnett and Qasim 2000). There have been several studies which have explored the benefits of gardening to human well-being; particularly urban gardening. In their study of 376 UK city residents, Dunnett and Qasim (2000) found that creating a pleasant relaxing environment was the most prominent individual value (76%) and being close to nature was the sixth (44%). Gardens were viewed as a necessary relief and contrast to the hard elements of the city. Garden wildlife was universally welcomed. Whilst in their survey of garden owners, Bhatti and Church (2004) found that the garden is an important site for privacy, sociability and sensual connections to nature and these activities can be understood as negotiations and practices to address the social and environmental paradoxes of late modern life, i.e. a space for mental and spiritual restoration. Similarly Eigner (2001, pp. 191–192) studied how participants involved in the voluntary maintenance of a local natural site found that working with nature induced 'an amazing feeling of happiness'; 'an inner sort of calm' and a feeling of really being satisfied, more relaxed and more themselves'.

A report for the Health Council for the Netherlands (Anon 2004) proposes that there are five ways that experiences in nature are psychologically beneficial. These are recovery from stress and fatigue (as above); encouragement to exercise; facilitating social contact; encouraging optimal development in children and providing opportunities for personal development and a sense of purpose and belonging. With regards to the latter, Roszak (1995) argued that this sense of belonging extends be-

yond our social and city limits to include a sense of belonging to the natural world; to feel connected to it. This 'connectedness to nature' depends on how people see themselves in relation to the natural world (Clayton and Opotow 2003).

As well as a way to find solace, wildlife gardening can reflect a self-identity rooted in such feelings of connection. Stets and Biga (2003, p. 406) define environmental self-identity as 'the meanings that one attributes to the self as they relate to the environment'. The relationship between connectedness to nature and self-identity is complex and inter-related. It is also more to do with affective rather than cognitive responses, i.e. the emotions that a particular subject, in this case love of wildness, arouses. In environmental psychology the general consensus is that we tend to identify with what we care about, i.e. the stronger the environmental identity, the more positive the attitudes towards the environment. Gardening is a highly personal activity and therefore it follows that wildlife gardeners represent their love and care of wildlife through their discernible gardening practices and the wildlife places they create. A nature lover's garden becomes a distinct place with which its owner/creator identifies.

Teisl and O'Brien (2003) conclude that people who enjoyed outdoor forms of recreation tended to display greater pro-environmental attitudes and behaviours than those people who do not engage in those activities. It has also been suggested that it is the emotional attachments that people form through experiential encounters that are instrumental in developing commitments to nature (Milton 2002). Thus it follows that the more time spent engrossed in outdoor activities such as gardening, the greater the emotional attachment to it, and the greater this emotional affinity the stronger the environmental self-identity (Hinds and Sparks 2009). For a growing number of people and organisations, this emotional affinity extends to wildlife. In his book, the Philosophy of Gardens (2006), Cooper discusses the manifestation of care and concern that is induced by the cultivation of a garden. Care arises when the garden becomes inhabited by the self alongside the caring of significant others such as plants, insects, birds and mammals.

In her study of wildlife tourism Curtin (2010) discovered a direct relationship between an interest in wildlife watching on holiday and attracting wildlife to their gardens at home; evidencing a distinct cross-over between holiday and home interests. Having designed a space where wildlife is welcome, the participants in her qualitative study revealed that seeing things in their own garden was just as thrilling as, and sometimes even more significant than, seeing wildlife on tour. In part this thrill is due to the nature of the encounter, in that they themselves have been successful in creating an environment which attracts wildlife, and the caring and nurturing emotions it provokes. There is a tenable sense of responsibility and relationship with these regular garden visitors and this is what makes it so important to their everyday world and everyday self. It highlights the protectionist value orientations people have towards wildlife (Kellert and Berry 1987) and was especially apparent for women whose children had left home and whose careers or jobs had become part-time instead of full-time as their financial prosperity had improved. Time becomes available to re-engage their interest in gardens and nature which fulfils an emotional need to tend to other living things. Finally, people often set

their calendar by natural wildlife events, for example, in England, the arrival of barn swallows (*Hirundo rustica*) in the spring, the sound of the cuckoo (*Cuculus canorus*) in summer and so forth.

Bentrupperbaumer (2005) suggests that the timely arrival of wildlife represents the 'miner's canary' of the ecosystem; a barometer of life itself (Knopf 1987) and reassurance of a viable and functioning natural environment despite the destruction that man causes. Whilst industrial and urban settings are not in keeping with traditional and romantic views of nature and wildlife, the emotional significance of seeing wildlife here is somewhat heightened by the wonderment and reassurance it arouses.

Visiting Horticultural Attractions

Key information sources regarding the state of current wildlife and the conservation of wildlife in gardens comes primarily from popular media. However other vital sources of information and inspiration come in the form of horticultural attractions and retail outlets. The latter consist of plant nurseries and garden centres and the former of visitor attractions both permanent, such as gardens, and temporary, such as horticultural events and festivals.

Garden centres have developed from plant nurseries and have an expanded range of products for the home and garden. Many are owned independently, but in the USA, Europe and Australia, home improvement chains have also introduced gardening departments. Additionally, some gardens such as the Royal Horticultural Society gardens at Wisley, England have opened garden centres as an additional revenue stream. In these centres information about wildlife in the garden is always displayed prominently as a promotion for the garden products on sale. Other garden centres provide for light refreshments in an environment surrounded by wildlife.

Whilst there is a growing body of academic literature on wildlife in domestic gardens, there is little when it comes to gardens that are visitor attractions, such as botanic gardens (collection-based institutions) or other gardens open to the public. Nonetheless the wildlife in these gardens is acknowledged and lists of the species that have been seen in the gardens can be found, for example at the Royal Botanic Gardens, Sydney, Australia (Anon 2012g). Occasionally, interpretation or 'living exhibits', such as the butterfly border at Birmingham Botanical Gardens, England (Anon 2012h) are developed; sometimes this is taken further with the inclusion of wildlife viewing infrastructure such as hides, wildlife interpretation boards and real-time television footage.

Figure 30.2 provides an example of how The Lost Gardens of Heligan (Anon 2012i) in Cornwall, England, have developed a wildlife hide alongside webcam technology to provide their visitors with live coverage of nesting birds and visiting mammals. This site has also featured on a wildlife television programme, not only promoting wildlife conservation and wildlife gardening but also the sustainable, eco-centric land management principles of Heligan. Another unique location

'The Lost Gardens of Heligan, near Mevagissey in Cornwall, are one of the most popular botanical gardens in the UK. Heligan's aim is to maximise biodiversity within a patchwork of habitats found throughout the 200 acres of historic Cornish estate and garden. Ancient woodland, hay meadows, grazed pasture, wetlands are all sustainably managed to encourage local wildlife. This is achieved using a variety of traditional methods including coppicing, charcoal burning, hay making, and low intensity grazing with our herd of Dexter cattle'.

'Horsemoor Hide lies at the heart of our estate, and offers the perfect location to enjoy Heligan's wildlife. There is a large wildlife viewing area; along with live and recorded footage, interactive displays, photographs and information gathered by our dedicated Wildlife Team. We use traditional land management techniques to benefit a wide range of wildlife for you to see here. We hope to encourage you to explore the fascinating natural world with us'.

Photographs provided with the courtesy of Lost Gardens of Heligan, 2012

Fig. 30.2 Horticultural attractions and wildlife

is the Wildlife Botanic Gardens at Bush Prairie, Washington USA. The 'Gardens are devoted to demonstrating and teaching gardening concepts which attract birds, butterflies, hummingbirds and other wildlife to residential gardens' (Anon 2012j). Managed by Naturescaping, a non-profit, all volunteer, educational organisation, the 9th garden was completed in 2008 and is devoted to hummingbirds and the native butterflies of the Northwest of America (Anon 2012k).

Fox and Edwards (2009) describe the development of horticultural shows and festivals from exhibitions of chrysanthemums in Japan about 900A.D. to the first European show in Belgium in 1809 and the Philadelphia Flower Show in the USA, two decades later. This is now held in 33 acres of the Pennsylvania Convention Centre making it the largest indoor Flower Show in the world. They distinguish between three types of horticultural show; first, large national/international shows with show gardens, celebrities and media coverage. The second type, they referred to as professional shows as they are regional events based on professional exhibitors selling plants and gardening accessories. The third are small local shows, la-

belled by them as amateur shows, at which gardeners compete for prizes for their flowers and vegetables etc. Both the two largest forms of show often contain exhibits on garden wildlife from conservation organisations and commercial sales stands.

Floriade World Horticulture Expo is an international exhibition of flowers and gardening that is held every 10 years in the Netherlands. The 2012 event received 2 million visitors and had as its overall theme 'Be part of the theatre in nature, get closer to the quality of life'. It included a 'Feel Good Garden' as part of a 'Relax & Heal' theme and a butterfly garden entitled, "Footkiss for Butterflies". The garden is in the shape of a huge, sloping leaf from the Japanese Ginkgo Biloba tree. A hedge consisting of large numbers of indigenous flowers marks out the periphery of the entry and is highly attractive to butterflies' (Anon 2011).

Wildlife festivals 'promote a variety of social, educational, economic, recreational, and community development goals' (Hvenegaard 2011). In North America, there were over 240 events in 2002, but they are significantly smaller than many horticultural shows, attracting only hundreds or a few thousand visitors. Rarely, however, do they relate to the wildlife in people's gardens or yards and as Hvenegaard questions, 'Does educating visitors about wildlife and their habitats at the festivals translate into environmentally friendly behaviour?' (Hvenegaard 2011, p. 382). Ultimately if we are to move to a more sustainable future, changing consumer behaviour towards more eco-friendly practices and consumption is fundamental. Wildlife gardening is perhaps a first important step towards the recognition of biodiversity and its intrinsic value to humankind.

Conclusions

The ethos of creating a space where wildlife is a vital, holistic part of the overall concept is becoming more fashionable. Wildlife is predominantly attracted to the garden by appropriate planting schemes but also through the provision of water, food and nest boxes. Whilst the inclusion of these is generally positive for conservation, it is not without some drawbacks such as a potential over-reliance on provisioned food, the unsustainable nature of production and transportation of bird food and the spread of diseases from feeders and bird baths. Despite this, the notion of symbiosis between wildlife and gardening appeals to modern concerns and sensibilities of nature, and is somewhat counter to more traditional forms of gardening where pest control and protecting prize produce was key. This gradual shift in values may, in part, be due to the constant reminders from popular media of the damage that man ultimately causes to the natural world as well as more intrinsic motivations such as the need to reconnect with nature through the process of biophilia.

The world's population predominantly lives in large urban areas but whilst this is a more convenient way of life, modern cities can induce high levels of mental fatigue caused by noise, traffic, people and an overload of mental stimuli (Waliczek et al. 2005). There is much research to suggest that all people need at least some interaction with nature (Ulrich 1983). Allowing the 'wild' into our lives has several

psychological advantages; notably mental and spiritual restoration, a reconnection to the natural rhythms of life and the happiness and peace derived from slowing down, observing more and reflecting.

Wildlife thus has the potential to add greater meaning and sensual appeal to gardens. It also satisfies the human need to tend to care for other living things. Gardening by its very nature imparts a sense of time and seasonal changes brought not only by the weather but by the natural cycle of fauna and flora. The anticipation of what might arrive and the resultant theatre, beauty and movement it brings engender an emotional attachment to the experience. Psychology suggests that it is the emotional attachments that people derive through experiential encounters with nature that are instrumental in the desire to care for it. Over time this desire to care for wildlife underpins a social self-identity of 'being a wildlife gardener' and the stronger that identity becomes, the greater the emotional attachment to its philosophy.

However, it is clear that not all wildlife is equally valued or welcomed with some species being undesirable (e.g. rodents), highly desirable (songbirds) and dubious depending on personal preference (e.g. bats). For a truly holistic approach to wildlife gardening there is arguably some work to be done with regards to the promotion of valuing all species rather than just the aesthetically pleasing or useful. As it is, the attraction of songbirds is the most sought. Horticultural attractions and events have an important part to play in the promotion of valuing biodiversity. Working alongside conservation organisations, some key attractions have taken a strong stance with their philosophy of wildlife gardening and this should only be encouraged.

To date very little research has been undertaken specifically to understand the consumer behaviour and experience of wildlife gardening or the importance and appeal of including wildlife in the design of horticultural attractions. Yet understanding how a sense of connection to nature can impact upon people's decisions to seek out nature in their daily lives is important if we wish to encourage the practice of wildlife gardening as a tool to enhance both connection to nature and urban/rural biodiversity. It will be interesting to see the content and results of such studies.

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